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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

DETERMINATION OF AN OPTIMUM
SYSTEM FOR WESTFORNET'S
CITATION DATABASE



Pacific Southwest
Forest and Range Experiment Station
Berkeley, CA 94701

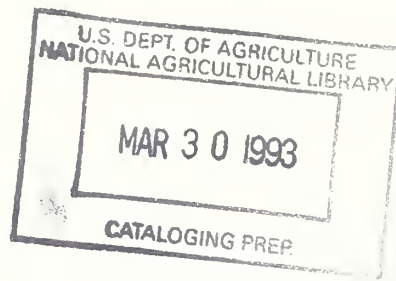
August 21, 1978
Edited January 31, 1979

(Rev. September 11, 1978; Final Corrections, December 27, 1978)

**United States
Department of
Agriculture**



National Agricultural Library



WESTFORNET

A special meeting of the Systems Coordinating Council was held on September 18, 1978, to review the WESTFORNET Study Team's report on "Determination of an Optimum System for WESTFORNET's Citation Database.

The conclusions of the Council were as follows:

1. Approved the recommended approach to secure BALLOTS and Auto Graphics as the appropriate data base system; however, it has to be obtained through the required procurement procedures. This is still to be worked out.
2. Recommended that State and Private Forestry undertake a study of the larger issue of Scientific Technical Information Systems and their role in the Forest Service. This is a logical part of State and Private Forestry's technology transfer mission.
3. Responsibility for WESTFORNET should remain with PSW for the time being.
4. The study was well done and served as an adequate basis for decisionmaking on the data base question.

A summary of the report on WESTFORNET is attached.


GLENN P. HANEY, Chairman
Systems Coordinating Council

WESTFORNET

WESTFORNET Study Team - Determination of an Optimum System for WESTFORNET's Citation Database.

Purpose of the Study

To determine the technical feasibility of moving the WESTFORNET library catalog database from FAMULUS to an acceptable on line automated library catalog system.

The Problem

Expansion from CALFORNET to PACFORNET to WESTFORNET exceeds the practical operating capacity of FAMULUS. The new database for WESTFORNET must be in the national standard bibliographic format (MARC) and should be serviced by a modern on line library cataloging system.

Study Team Approach

SCC on March 14, 1978, approved formation of a study team to determine an optimum system for the WESTFORNET citation database.

The Study Team had:

5 core members, four of them intimately familiar with WESTFORNET and one representing the SCC and the WO editorial interest. Core members were also familiar with state-of-the-art automated library systems.

3 cooperators representing SEA-TIS-NAL, University of Washington, and ASCUFRO libraries.

13 observers, being librarians from USDI, EPA, DOE, FED LIBRARY Committee and other professionals from professional societies and the Forest Service.

Study Team Mission

Identify minimum and optimum requirements for the WESTFORNET database maintenance system.

Identify existing available systems having these requirements.

Determine citation format for the database.

Report preliminary findings and draft evaluations and recommendations.

Complete field work and draft report.

Present final report to SCC.

Study Team Approach and Findings

Identify minimum and optimum system requirements.

Identified qualified systems able to maintain database and produce all required outputs, including 4 (and later 6 or more) regional monthly alerts.

Established liaison with other agency libraries and information services having common program interest with the Forest Service, by telephone, correspondence and field interview.

Determined the preferred citation format for the WESTFORNET database.

Denver Meeting - June 8-9, 1978

- To examine findings
- To discuss alternatives and foreseeable consequences
- To draw conclusions from the evidence
- To make recommendations

Present were 5 study core members, 3 cooperators and 3 observers representing SEA-TIS-NAL, SOUTHFORNET, University of Washington, WO, SE, RM, PSW, SEA-TIS-CALS, ASCUFRO, and, of course, WESTFORNET.

1. Evaluated and criticized drafts of the Study Team Report.
2. Evaluated field work.
3. Pinpointed areas for further study.
4. Came to 10 technical and 6 managerial conclusions.

Technical Conclusions

1. Move WESTFORNET database to BALLOTS or WLN (Washington State Library Network) - whichever the second phase of field work concludes the better choice. Ruled out OCLC (Ohio College Library Center).
2. If further field work conclusively shows this cannot be done without jettisoning one or more required outputs, develop FAMULUS CL (150) as a fall back program.

3. Once on an automated cataloging system, supply NAL with MARC2 communications format tapes.
4. Begin to catalog WESTFORNET materials in NAL - compatible MARC standards as soon after January 1, 1979, as possible.
5. Strengthen the data base as a potential national database, with eventual SOUTHFORNET and "NE-FORNET" input, by including all Forest Service documents, e.g., all Research papers, notes, resource bulletins, all NFS and S&PF papers, notes, etc., all FS written open-literature, plus general and regional publications of interest to WESTFORNET, SOUTHFORNET, etc., and the important "gray literature."
6. Handle interchange with NTIS by going through existing NAL programs for converting MARC to COSATI format.
7. Provide public access to WESTFORNET database by utilizing it as a separate subset of NAL's AGRICOLA, now available on 3 commercial services to industry, government agencies, academic and public libraries.
8. Design into WESTFORNET citation format tags to permit pulling out subsets for Station annual publications, Research, accomplishment reports, special subject bibliographies.
9. Regard the database as a union catalog of WESTFORNET materials. Make it more archival. Reduce weeding, making the database more valuable as a national forestry literature record.
10. Do not convert PACFORNET file. Close tape, and put it up on commercial systems having WESTFORNET, where both files can easily be searched together.

Technical Considerations - Managerial

The 13 managerial considerations in the study plan of May 11, 1978, were incorporated into 6.

1. Staffing. Skills needed are the same as required by other research libraries using automated cataloging systems. WESTFORNET has these aboard now. Should we have to fall back on FAMULUS CL, a part-time programmer will be required. The present $\frac{1}{2}$ time, temporary cataloger will have to be made full-time, GS-9 level, as the input load increases. (We are investigating the possibility of contracting out for cataloging.)

2. Location. Must be similar to present location, offering:
 - a. proximity to major research library.
 - b. in or adjacent to a WESTFORNET service center.
 - c. near potential contractors.
3. Costs. Estimates can be given for the three feasible alternatives using known BALLOTS costs for on line system estimates.
 - a. Go entirely commercial:
 - on line catalog system
 - specialized catalog publisher.
 - b. Use on line system for database construction and maintenance and write a program to take MARC2 tapes and produce FAMULUS CL formats for in-house production of Monthly Alerts and catalogs.
 - c. Develop FAMULUS CL to make MARC-like formats for NAL, permitting us to do all work in-house, yet giving NAL eventual MARC tapes via their conversion program (which would have to be written).

The difference between the cheapest and the most expensive of these alternatives--including start-up costs--is about \$15,000 the first year.

- a. All commercial route - \$36,320
- b. Mixed commercial and in-house - \$28,300
- c. All in-house batch system - \$21,000.

Option "a" frees us of in-house program maintenance and provides for indefinite expansion of database.

Option "c" commits us to a minimum of 480 programming start-up hours and about 1120 computer technician hours annually to produce FAMULUS CL outputs, updates, and editorial corrections. It also commits us to limits on database size or else rapid cost escalations as the database expands.

This \$15,000 buys for the Forest Service:

- a. Output tapes that conform to national standards and will exchange and interface with planned national library networks.

- b. The labor-saving advantages of on line cataloging, editing, searching and updating.
 - c. On line access to all the other library resource records in the system--research, special and corporate libraries.
 - d. Online access to the WESTFORNET database by all WESTFORNET libraries and future SOUTHFORNET libraries.
 - e. In near future (2 years) automated book-ordering, periodical file control, authority files.
4. Funding. Now done by equitable assessments on contributing FS units. While WESTFORNET is the only up and running network, this appears okay. With a WESTFORNET/SOUTHFORNET/"NE-FORNET" configuration, WO office funding would be in keeping with general assessment for activities benefiting all Deputy areas and field units.
 5. Impacts on ADP and Federal Telecommunications. None of the proposed options would have more than a negligible effect on these areas. All of WESTFORNET might add 3 hours a week to present FTS usage.
 6. Effects of Alternatives for Managing WESTFORNET's Database on Planning for Other Scientific-Technical Services. No effects on hard data systems, conferencing systems, or administrative systems. Salutary affect on library planning because in line with national and international developments.

Core Study Team's Recommendations - Technical

1. Conclude technical consultations with SEA-TIS-NAL, BALLOTS, and Auto Graphics to establish:
 - a. input format, field contents
 - b. output formats, timing.
2. Contract for service with BALLOTS, Auto Graphics.
3. Change to new system January 1, 1979, or soonest thereafter.

Core Study Team's Recommendations - Managerial

1. Management of sci-tech information systems in the Forest Service. Not studied. Such a study requires:
 - different skills
 - more time
 - major SEA-TIS involvement

Charge TT group to make such a study.

2. Management of library database:

- a. Use WESTFORNET skills for changeover and management.
- b. Provide a GS-9/11, or a contractor, for cataloging and indexing.
- c. Leave WESTFORNET-Central at Berkeley through transition,
- d. Reconsider location after decisions regarding SOUTHFORNET, "NE-FORNET".
- e. Negotiate with WO to fund WESTFORNET-Central.

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DETERMINATION OF AN OPTIMUM SYSTEM FOR WESTFORNET'S CITATION DATABASE

EXECUTIVE SUMMARY

Progressive geographic expansion of the special library service known as WESTFORNET, Western Forestry Information Network, has strained the capacity of its cataloging system and citation database. For more than a decade the library catalog and database have been maintained by the FAMULUS system of programs. This batch system was developed before national standards for bibliographic citations on tape were established and before any on-line automated library cataloging systems were available. WESTFORNET has special needs for which the FAMULUS programs have been revised and expanded over the years. But FAMULUS is costly and inefficient to use compared to modern, on-line, automated library cataloging systems. This situation led to a study to determine the feasibility, costs, and service benefits of changing from the current system.

The study, authorized by the Systems Coordinating Council of the Forest Service, was undertaken to determine what changes should be made in the structure and management of the WESTFORNET database. Because the database is of use and value not only to the Forest Service but also to other Federal agencies and co-operating university libraries, the Study Team was expanded to include observers having many affiliations and viewpoints. This gives a very broad perspective to the study, its conclusions, and recommendations.

The Study Team approached the problem by these steps:

- Identify minimal and optimal requirements for WESTFORNET's database
- Identify qualified systems for construction and maintenance of the database and for production of its outputs, and *Monthly Alerts*
- Establish liaison with other agency libraries having common concerns
- Determine the preferred citation format for the database
- Report preliminary findings and draft conclusions and recommendations
- Complete field work and draft report
- Solicit comments on the report
- Present the final report to the Systems Coordinating Council

The examination of automated library cataloging systems focused on WESTFORNET's service as a special kind of union catalog. The library cataloging system is called upon to perform functions and produce outputs not required in a purely bibliographic or citation database. Only two major automated, on-line, shared cataloging systems met the technical needs of WESTFORNET. These were the Ohio College Library Center, the Washington State Library Network, and BALLOTS at Stanford University. All have been tested in a multi-library environment and are actively seeking new customers. Their files are in MARC-format and entry corrections, and modifications are made on-line through the use of interactive programs designed explicitly for use by libraries. They also allow for on-line

reference searching, automated book purchasing, automated control subscriptions to periodical and recording materials and shelf locations in each library. After careful study, BALLOTS was determined to have least limitations and greatest opportunities for meeting the needs of WESTFORNET.

To utilize BALLOTS, WESTFORNET would also require a supplementary text-handling system in order to:

- Print the *Monthly Alert* in four regional additions
- Produce special bibliographic subsets of the database
- Produce bibliographies on special subjects for users
- Distribute WESTFORNET's union catalog to cooperators

The two most likely vendors of text-handling systems, Aspen Systems and Auto-Graphics, were visited during the study. Either of these vendors can furnish the necessary products for WESTFORNET.

The Study Team also explored procedures for making the WESTFORNET database available for search on commercial systems such as DIALOG, ORBIT, or BRS. The team determined that WESTFORNET probably should become a subset of NAL's AGRICOLA database which would make it available through DIALOG, ORBIT, and BRS. This would vastly increase the public utility of the WESTFORNET database and would result in strong technical cooperation with the National Agricultural Library.

The Study Team and observers arrived at 10 technical conclusions:

1. Move WESTFORNET's database to BALLOTS.
2. If such a move cannot be consummated, then replace the present FAMULUS with an expanded version known informally as FAMULUS 150.
3. Once on BALLOTS, supply NAL with MARC II communication format tapes.
4. Catalog WESTFORNET materials by NAL's MARC standards starting January 1979, or as soon thereafter as possible.
5. Give no further consideration to relating to the National Technical Information Service (NTIS).
6. Provide public access to WESTFORNET's database through NAL's AGRICOLA on several commercial bibliographic searching systems.
7. Strengthen WESTFORNET's database as a potential national database.
8. Cause the database, as a union library catalog, to become more archival.
9. Provide, through cataloging, for pulling out subsets of Forest Service documents.
10. Do not convert the back file from FAMULUS to MARC format.

Thirteen questions posed in the study plan led to managerial conclusions:

1. A highly qualified, cataloging specialist is needed to: prepare the catalog; select acquisitions to be included in regional *Monthly Alerts*, index materials, evaluate work done, prescribe modifications or changes in procedures, coordinate the development of WESTFORNET's database with the librarians of cooperating libraries.

2. Locate management of the database under conditions similar to those presently found at Berkeley including: proximity to a major research library; proximity to a WESTFORNET service center; and availability of a local pool of qualified professionals to assist in the database management. If and when a fully national system becomes operational, consider locating management at the National Agricultural Library or, as at the present time, at a regional headquarters such as Berkeley.

3. All factors related to costs could not be pinned down, but three alternatives merit serious considerations.

--Go entirely commercial using BALLOTS and Auto-Graphics (about \$30,000 annually, plus \$6,300 start-up costs).

--Use BALLOTS and FAMULUS 150 (about \$21,800 annually; plus \$6,500 start-up costs).

--Develop and utilize only FAMULUS 150 (about \$15,500 annually plus \$6,000 for start up costs).

The cost difference between doing a half-way job with FAMULUS 150 versus moving to a fully automated, on-line, cataloging system is about \$15,000 per year. The study team considers the advantages to be gained unquestionably worth this cost.

4. Funding of the WESTFORNET central operation currently is by reimbursement from participating Forest Service units. While this is equitable for the regional network, the potential for serving national needs and other regional networks merits consideration of WO funding by general assessment as is befitting activities that benefit all deputy areas and field units.

5. Moving the WESTFORNET database activity to an on-line, automated cataloging system will have negligible effects on Federal ADP and telecommunications systems.

6. Decisions regarding alternatives for managing WESTFORNET's database would have no effect on other scientific-technical services such as hard data systems, conferencing systems, or administrative information systems. It would have an effect on library systems, but this effect already exists. It would offer advantages to those contemplating moving toward the current state-of-the-art in library management. It should not be prejudicial to any advance to library developments. Placing of the database on a given on-line cataloging system or searching system would not preclude its later being moved to other systems and services.

Recommended actions are:

1. Undertake detailed consultation with NAL and BALLOTS;

2. If the formating problems are solvable, WESTFORNET should develop an action plan for moving the database to BALLOTS, with Auto-Graphics as the text handling interface system.

3. If the forming problems cannot be overcome, FAJULUS 150 should be developed and utilized.

4. With respect to management of the WESTFORNET database, the immediate need is to establish a technical support configuration for the database as recommended above.

5. Management and details of this technical development should be assigned to those at Berkeley who are intimate with its peculiarities, its contents, and its service potentials and who have the expertise and commitment to effect the required changes.

6. Defer any further decision about future location and management of WESTFORNET-Central until ongoing studies of SOUTHFORNET and of the technical information systems within the Forest Service have been completed.

Purpose of the Study

To determine the technical feasibility of moving the WESTFORNET library catalog database from FAMULUS to an available on-line automated library cataloging system; to determine the costs and service benefits to be gained if a move proves feasible

1. Statement of the Problem

Since 1968 the PSW Station library catalog has been maintained by the FAMULUS system of programs. This batch system was developed from an earlier experimental program written at PSW to maintain the library catalog. This was before national standards for bibliographic citations on tape were established and before any on-line automated library cataloging systems were available.

During the past decade the PSW library and its catalog have expanded to serve CALFORNET (1971), PACFORNET (1975), and WESTFORNET (1978). To keep up with the growing size of the library catalog and the increased number of input stations, which now include Seattle, Ogden, Ft. Collins, and Berkeley, PSW has revised and expanded the FAMULUS program over the years. They are able to produce all the necessary outputs for the WESTFORNET union library catalog. However, production is accomplished with considerable expenditure of staff and computer time compared to the efficiencies offered by existing on-line automated library cataloging systems. The details of the evolution from PSW to WESTFORNET and the attendant expansion of FAMULUS capacity and capability are found in Appendices I and II.

2. Reason for the Study

The WESTFORNET database represents a major effort to document and record the locations of technical literature of interest and relevance to the Forest Service and other Federal and State forestry agencies. It probably contains up to 75 percent of the non-journal, North American forestry literature. This makes it a potential national bibliographic resource. As such, its utility to potential users and to other libraries can only be fully realized if the present citation format, necessitated by FAMULUS, is changed to the *American National Standard for Bibliographic Interchange on Magnetic Tape*. Specifically, the MARC format is required. This format is used by the research libraries to which WESTFORNET relates. The National Agricultural Library, for years using a non-standard format, will convert to MARC in 1979. The details of the potential applications of the WESTFORNET database, its relations to other Federal agency citation databases, and for necessity the MARC format are contained in Appendices III, IV and V.

The feasibility of converting WESTFORNET's union catalog database from FAMULUS to a suitable on-line cataloging system was seen as more than a narrow technical problem. The system's requirements for production of all the necessary WESTFORNET bibliographic outputs were quickly defined (see *Study Team Approach*, 4a, below). It was also necessary to establish liaison with the National Agricultural Library to explore avenues for technical cooperation leading to maximum benefits when both we and they have compatible input formats.

Cooperative possibilities with related agencies were also to be investigated (see Appendix VI).

Thus, the WESTFORNET Study Team was constituted with a fairly broad charter. It's membership consisted of a core team with observers from a variety of backgrounds (Appendix XII).

3. Approval of the Study

On March 14, 1978, the Director, PSW, and the WESTFORNET Coordinator appeared before the Systems Coordinating Council to propose a study of the current and future management of the WESTFORNET database. The Council authorized PSW to develop a study plan. This plan, drafted on March 24 and revised May 11, guided the Study Team.

4. Study Team Approach

a. Identify minimal and optional requirements for WESTFORNET's database.

The FAMULUS programs provide the minimum of technical support needed to operate the WESTFORNET database and to produce various outputs needed for the services directly dependent on the database. FAMULUS also meets the internal requirements for editing, updating, deleting, etc. But processing with FAMULUS is only accomplished at the cost of inefficiencies discussed in Appendix II. These are inefficiencies inherent in a batch system.

As WESTFORNET can be said already to have the "minimum" of support necessary to maintain operations, the phrase "minimum and optional requirements" in this section refers to those which must be met by any on-line system, or combination of systems, to which WESTFORNET's database might move from FAMULUS. These requirements are set forth in Appendix XI as evaluation criteria. They guided the field investigations when candidate systems were examined.

b. Identify qualified systems for: (1) construction and maintenance of the database; (2) production of the Monthly Alert; (3) production and update of WESTFORNET's catalog.

The number of automated cataloging systems in the United States is small in comparison to number of software packages for bibliographic databases. Some of the automated cataloging systems are restricted to a set of pre-selected users. Several are exclusively dedicated to one library or network. Only three candidate systems can demonstrate widespread use by research and other libraries. They are the Ohio College Library Center, the Washington Library Network, and Stanford's BALLOTS. These three actively solicit new members. All were evaluated, and the latter two were visited, by the WESTFORNET team's system specialist.

Users of these three systems who desire extensive hardcopy or COM outputs must employ an interfacing text handling system. FAMULUS itself is the only single system that can produce all the required WESTFORNET outputs. The Study Team evaluated the two most widely utilized interfacing systems. One is SAMANTHA, as marketed by Aspen Systems, Inc. The National Agricultural Library also has the SAMANTHA program. BALLOTS interfaces with Auto-Graphics, Inc., in Southern California. Evaluation visits were made to both Aspen and Auto-Graphics.

c. *Establish liaison with other agency libraries having subject concerns parallel to those of WESTFORNET.*

In addition to the National Agricultural Library, with whom we expect to enter into technical cooperation, the following departmental agencies and libraries were visited in the Washington, D.C., area: Library Systems Branch, EPA; National Technical Information System, Dept. of Commerce; Library Services Office, USDI; Federal Library Committee; and Dept. of Energy's Oak Ridge National Laboratory in Tennessee. The purpose of these field interviews was twofold: to discuss with them our proposed study; and to learn of any new or proposed systems and other developments into which the Study Team should probe further. The detailed account of these visits is in Appendix VI.

d. *Determine the preferred citation format for the WESTFORNET database.*

The FAMULUS system is not able to store all the sub-fields required by the two national standard formats for bibliographic tapes, COSATI or MARC. The 150-field version of FAMULUS can produce MARC-like formats, but they would require a further conversion program before they could be used. Those agencies with which WESTFORNET has the closest interface possibilities, including academic libraries, all use MARC. Users of both COSATI and MARC were interviewed. MARC has been selected as the recommended format (see Appendices V and VI.)

e. *Bring together Study Team and observers after first phase of field work to report findings and to draft conclusions and recommendations.*

The meeting of Study Team and observers took place in Denver, June 8-9, 1978. Those who could attend were:

Vincent P. Aitro, Supervisory Librarian, WESTFORNET--Berkeley
Frances Barney, Librarian, WESTFORNET--Ft. Collins
Hilary Burton, SEA-TIS-CALS
R. Z. Callahan, Director, PSW
James W. Clarke, PSW, Study Team Member, Systems Specialist
L. David Dwinell, SE Station, representing the SOUTHFORNET Committee
Barbara Gordon, Forestry Librarian, University of Washington, with administrative responsibilities for WESTFORNET--Seattle
Robert H. Hamre, Information Officer, RM Station, representing the WO editorial offices
Verne van Dyke, SEA-TIS-NAL
Linda White, University of Arizona, representing the several automated information systems and services in Tucson, and, along with Barbara Gordon, attending as a librarian from an institutional member of the Association of State College and University Forestry Research Organizations
Theodor B. Yerke, PSW, WESTFORNET Coordinator

The Study Team evaluated and criticized drafts of the material comprising the appendices of this report. It evaluated the findings of the field interviews and systems evaluations. Areas for further direct examination were pin-pointed. This work has since been done, and findings were incorporated in this report. Basic conclusions were formulated by participants at Denver.

5. Field Work and Findings

a. *Examination of automated library cataloging systems.*

Records in library catalogs and citations in bibliographies and in indexing/abstracting journals are superficially similar. However, their uses and rules for their construction differ significantly. Citations in bibliographies seldom indicate library locations where a user can see the cited publication. (The AGRICOLA database is a notable exception.) Their usual purpose is merely to record that an item has been published. Library catalog records, being location-specific, record the actual materials in a given library, provide a location number for the item on the library's shelves, and carry other information essential to the organization and maintenance of the library collection. *Union catalogs* do this for a number of libraries in one catalog. WESTFORNET's database is a special kind of union catalog.

Rules for creating library catalogs are more structured and more widely standardized than the style codes in use by various editorial and publishing groups issuing bibliographies and indexing/abstracting journals. The differences are in important areas which include abbreviations, typographic style, order of data elements, rules for alphabetization, and determination of authorship. Library rules reflect operating realities encountered in building and maintaining large collections, requirements of library work-flows, and facilitation of interlibrary borrowing and loaning.

It follows that automated library cataloging systems will be called upon to perform functions and to produce outputs not required in a purely bibliographic or citation database.

We can examine only three candidate systems for WESTFORNET. Other technically qualified systems, about which we know, are not soliciting outside users. These three systems are: the Ohio College Library Center (OCLC), at Columbus; the Washington State Library Network (WLN), at Olympia and Pullman; and the BALLOTS system at Stanford University, Palo Alto. These are the three major automated, on-line, shared cataloging systems in the United States. They have been tested in a multi-library environment and are actively seeking new customers. They are large systems which organize the holdings of many libraries in essentially one file, accessible to all users. The files consist of MARC-format original cataloging provided by participating libraries and MARC records provided on periodic tapes by the Library of Congress. New entries by users, as well as corrections and modifications, are made on-line through the use of interactive programs designed explicitly for library catalog input. The programs include prompting for successive steps of cataloging and checking of entries for errors. Users with new documents to catalog first search the file. If an entry already exists for that item, it is only necessary to attach their library's ownership symbol to the record plus local entries peculiar to their catalog. Items already cataloged can save some libraries as much as 90 percent of the effort they might expend if working alone. Much of the material cataloged by WESTFORNET is not usually cataloged by other libraries, but approximately 30 percent of our material may be also cataloged by the Library of Congress or other special libraries using these systems. WESTFORNET would realize cataloging savings by using these entries. Other major features of automated cataloging systems allow on-line reference searching with the use of authority files, automated book purchasing, and automated control of periodical subscriptions. Reference searching can be performed not only on a user's file, but on the entire holdings of all the other libraries in the file. This is of particular importance to

WESTFORNET since we need access to the holdings of large research libraries which are using these systems.

OCLC is the largest and oldest of the systems and currently serves over 700 libraries. WESTFORNET already uses OCLC through a National Agricultural Library contract with the Federal Library Committee. We use the system to verify entry forms and to borrow catalog entries for our own cataloging. But OCLC has definite drawbacks in its design and operation which have resulted in its being described as an automated catalog support system rather than an automated cataloging system. It is not a substitute for a library's catalog, which must still be maintained separately. This, and the inability of this system to do Boolean subject searching, the lack of full access to local catalog information, and the problems OCLC has with multiple duplicate entries eliminates it as a candidate for the WESTFORNET catalog. These shortcomings are failures to meet requirements I-D and IV of the needs listed for WESTFORNET (see Appendix XI).

WLN, the newest of the systems, has promising design and capability. Written by Boeing, it incorporates advanced features earlier developed for the proprietary systems of the University of Chicago and the New York Public Library. But WLN is still essentially oriented to the needs of the library community of the State of Washington. It has few outside users and levies a 7.5 percent surcharge on out-of-state users. The telecommunications costs for lines to Pullman (9600 band synchronous) represent a considerable expense for a smaller user. But the important consideration which works against our considering WLN is their lack of hospitality to a special library network. They have very strict subject authority controls. All subject headings must be approved by the Library of Congress. WESTFORNET has developed its own subject headings to meet the special needs of its users. These subject headings are not incompatible in format with those of the Library of Congress, but they would not be acceptable in the WLN database. That means that WESTFORNET libraries would be unable to search their own database by subject on the WLN system. This would severely limit access to the files, criterion I-E of the listed needs for WESTFORNET.

BALLOTS is an acronym for *Bibliographic Automation of Large Libraries Using a Time-sharing System*. It began as an in-house system for the Stanford University libraries. But it now serves 120 other libraries. Over 15 percent of these are special libraries, a feature making BALLOTS an especially attractive environment for the consideration of WESTFORNET. One of the principle users is the University of California, Berkeley, which is putting all new monographic acquisitions into BALLOTS. The Research Library Group, consisting of Columbia University, Yale University, and the New York Public Library have recently signed contracts with BALLOTS. When their resources come on-line in 1981, access to these major Eastern libraries would be important to SOUTHFORNET and to any counterpart in the Northeast. Growth of BALLOTS to full national network scale has led to plans for it to become independent of Stanford University, governed through a body elected by its users.

BALLOTS satisfies the needs of WESTFORNET's database (as stipulated in Section I, IV and V of Appendix XI.) Growth of the network of users, and particularly stipulations contained in the contract with the Research Libraries Group, expedite the addition of new features scheduled for operation in 1979. This includes authority controls permitting the use of local subject headings, an important consideration for the special libraries belonging to WESTFORNET.

Advantages of using an automated cataloging system such as WLN or BALLOTS can be shown quite simply. The central cataloging unit of WESTFORNET would operate most effectively with a dedicated line and CRT terminal. The remaining network libraries could use a dial up line and a teletype-compatible terminal for access to the system. This would permit them to search the WESTFORNET database by author, title, subject and other necessary handles. New material entered by the central cataloging unit would be known to the other libraries immediately. All WESTFORNET libraries would be able to search all the holdings of all libraries using WLN or BALLOTS for the purposes of interlibrary loan. Immediate access to the Library of Congress MARC tapes in the system would provide bibliographic information about newly cataloged or published material from all over the world. WLN now has, and BALLOTS has scheduled for operation in the near future, on-line acquisitions and serial records. These features allow all the network libraries to discover whether any of their number has already placed an order for a book, or receives a serial, which any one library is considering for purchase.

None of the above advantages are available in a batch system, and approximate lists, etc., can only be produced at considerable costs in time and money on an intermittent basis. From the CALFORNET period to the present, it has been possible with FAMULUS to update the catalogs provided client libraries only once or twice a year. With the complications of the WESTFORNET configuration, the hardcopy and COM catalogs can be updated only annually, and at considerable expense. This expense is not only the cost of the final outputs themselves, but involves many hours of manual correcting and keypunching followed by elaborate manipulations of the various FAMULUS options invoked in order to purge, correct and input into the WESTFORNET master database. In the on-line mode, the updating and correcting of the database is done immediately when the proper input is transmitted from the WESTFORNET cataloging unit to the system computers. And it is immediately available to all users of the system.

b. *Examination of text-handling systems.*

A library utilizing one of the automated systems examined above has two options in regards to existing, manually maintained card catalogs. It may order 3x5" cards from the new system, interfile these with their existing cards, and cease in-house card production. This has been the usual option selected by large libraries going to OCLC. A library may, however, elect to close its old catalog, leaving it as a retrospective tool. From the date of closing its catalog simply is stored in the system itself. BALLOTS and WLN were especially designed for this purpose, though they also produce cards.

When the second choice, above, is made, there remains the need to provide a library catalog for the library's users. A library can place on-line CRT terminals at service points within the library or library system. This is the solution of the near future. But it is presently both expensive and requires a bit of user sophistication. More commonly, the library contracts with a vendor having text-handling equipment set up to take MARC2 communication format tapes from OCLC, BALLOTS, or WLN and to produce hardcopy or COM catalogs from them.

WESTFORNET's special network operation requires four additional products:

- Camera-ready copy to print the *Monthly Alert* in four regional editions;
- Special bibliographic subsets of the database for needs of the Forest Service, e.g., *Research Accomplishment Reports*; annual lists of publications for Station and other units;

- Bibliographies on special subjects upon demand for WESTFORNET's users;
- Multiple copies of the WESTFORNET union library catalog for distribution to more than 50 cooperating libraries and other interested agencies.

Our present operation lacks the capability to produce high quality output in upper and lower case for photo composition. While many text-handling systems may have the technical capacity to produce library catalogs from MARC2 format communication tapes, there are very few which are actually geared up to do this and have proven operational competency.

We have visited with the two most likely vendors, Aspen Systems, of Germantown, PA, and Auto-Graphics, in Monterey Park, CA. Aspen Systems uses the SAMANTHA program, which is also owned by the NAL and the GPO. Auto-Graphics has its own programs designed to process MARC2 tapes and specifically BALLOTS MARC2 tapes. The company provides book and COM catalogs for over 30 libraries, including Stanford University and six State Union catalogs throughout the country. Aspen would not give us a price estimate without a tape in hand. Auto-Graphics was not only willing, but their quoted prices are quite reasonable (Appendix XIII.)

In order for WESTFORNET to obtain all desired outputs from either of these vendors, the input format for WESTFORNET (the MARC2 profile) must be carefully designed to assure that the necessary codes for recognizing members of special subsets are included. This problem is addressed in Appendix VIII. There is no doubt that either SAMANTHA or Auto Graphics can furnish the necessary products.

One other form of printed output is needed from the WESTFORNET database. Though neither an automated cataloging system nor an inter-facing vendor is prepared to furnish it, the need is still easily met. The WESTFORNET database is searched by users in the same way as databases available on commercial systems, such as DIALOG, ORBIT or BRS (Appendix XIV.) We now do this using FAMULUS. However, the WESTFORNET database can be made available on one or more of the commercial bibliographic retrieval services. These produce printed citations of searches made (Appendix IX.) This is the route FIREBASE has been authorized to explore. We would probably go onto DIALOG as a subset of NAL's AGRICOLA database. This would vastly increase the public utility value of the WESTFORNET database, since AGRICOLA is on all three (BRS, LOCKHEED, SDC). Going this route would be one of the results of proposed technical cooperation with the NAL.

While converting to the MARC format and during the shake-down period with the selected vendors, it is imperative that nothing interfere with the regular production of the WESTFORNET *Monthly Alert*. Until the MARC format is worked out and the profile accepted, WESTFORNET database operations will naturally continue as at present on FAMULUS. When the WESTFORNET cataloging unit actually shifts to the production of library records in MARC format, FAMULUS will no longer be able to process them. Instead, we will be receiving MARC2 communication tapes from the automated cataloging system. However, a program can be written for FAMULUS which will take from the MARC2 tapes only those fields necessary to format the citations appearing in the *Monthly Alert*. This would permit the uninterrupted production of the *Alert*, and if necessary, the production of COM and hardcopy catalogs until all bugs are worked out of the new operation. Then we would cease any in-house FAMULUS processing of WESTFORNET materials.

6. Conclusions

a. *Technical considerations.*

At the meeting of the Study Team and observers in Denver, June 8-9, the materials which make up the appendices of this report were examined and discussed. The conclusions drawn represent input from the operators of WESTFORNET, from the National Agricultural Library, from WESTFORNET Service Center librarians, and from two University librarians, a delegated representative for the Systems Coordinating Council, and a representative of the SOUTHFORNET Committee. Their ten conclusions, as modified by the suggested further works were:

(1). If all requirements can be met, move the WESTFORNET database to either BALLOTS or WLN. Use a dedicated line with the system's required CRT terminal for inputting the cataloging. Since the meeting we have determined that the requirements can be met by BALLOTS. There are no technical obstacles of a nature which can be foreseen short of actually beginning interaction with the system.

(2). A precautionary recommendation was formulated if further field interviews showed that no combination of other systems could replace the present FAMULUS system. In that event, we were to develop a version of FAMULUS known informally as FAMULUS 150 (Appendix VII.) This version could produce MARC-like tapes. The NAL would then convert these to a tape which they could utilize in lieu of the input described in item 3 below.

(3). Once on BALLOTS, supply NAL with a MARC2 communication format tape for them to use *en toto* or in part for AGRICOLA, AGRIS, etc. Verne van Dyke, NAL, was earlier given a sample BALLOTS MARC2 tape. He reported that they had no difficulties reading it at NAL.

(4). Begin to catalog WESTFORNET materials in NAL MARC standards by January 1, 1979--or whenever possible thereafter. This presumes visits to NAL by our cataloger and the working out of mutually acceptable profiles with NAL and BALLOTS.

(5). Give no further consideration to special efforts to relate to NTIS. NAL has programs which can convert MARC to COSATI formats. Field interviews also determined that NTIS is quite willing to accept variations of input formats by different contributors.

(6). Solve the problem of public access to WESTFORNET by utilizing NAL. AGRICOLA is up on several commercial bibliographic searching systems. The WESTFORNET database would be a subset of AGRICOLA. It could be searched separately by a user, or as part of the whole of AGRICOLA.

(7). Strengthen the WESTFORNET database as a potential national database with eventual input from SOUTHFORNET and the Northeastern region. Beginning with the use of an automated cataloging system, WESTFORNET

- a. should contain *all* Forest Service documents
 - all research papers, notes, resource bulletins, etc.
 - all NFS papers, series, etc.
 - all S&PF papers, reports, etc.
- b. should contain materials of special Western interest

key articles from ca. 30 journals
other non-journal materials

(8). Cause the database, as a union library catalog, to become more archival. Annual weeding should be reduced in view of the database's increasing importance as a national record of forestry and related literature. But material of an ephemeral and time-limited value should continue to be purged after demand falls off.

(9). Design tags into the MARC fields for local cataloging in order to permit pulling out subsets of Forest Service documents needed for annual lists of Forest Service publications, *Research Accomplishment Reports*, and other defined categories.

(10). Do not plan to convert the back file (e.g., PACFORNET's file) from FAMULUS to MARC format. Aside from the question of whether it could even be done short of redoing 17,000+ citations individually, the file can be

- a. searched in batch mode wherever the tapes and FAMULUS are available
- b. searched on a commercial system, where, if in conjunction with the WESTFORNET subset of AGRICOLA, the two files could be searched as if they were one

These conclusions represent the consensus of those present at the Study Group meeting in Denver and, together with the Management Considerations below, have guided formulation of the recommendations.

b. *Managerial considerations.*

The proposal to change the system for handling the WESTFORNET database raised managerial considerations, both in terms of the present role of "WESTFORNET Central" (Appendix X) and the future role a central unit would play as forestry information networks become established in other geographic regions. Thirteen managerial questions were included in the Study Plan of May 11, 1978. These were discussed by the Study Team at its Denver meeting. The questions fall into five principal categories:

(1). Staffing. What skills are necessary to operate and manage the WESTFORNET database? If an automated cataloging system is selected, the skills needed are of the same order as those found in the cataloging departments of research libraries now using such systems. If we remain on FAMULUS, a computer technician and part-time programmer are required. (See also under *Costs and Funding*.) One person is needed who can

- do MARC format cataloging on a remote-input terminal
- select from all WESTFORNET acquisitions those that should be in each of the four regional WESTFORNET Alerts
- index forestry-oriented subjects
- evaluate work done for adherence to quality standards
- evaluate system performance and prescribe modifications or changes in procedures
- understand vendor-instigated system changes and adjust WESTFORNET processes to them
- coordinate WESTFORNET database activities with the librarians of cooperating libraries.

(2). Location. Where should the management of the database be located? Any location would have to be very similar to the present location at Berkeley. If a move is contemplated, the new location must have:

- proximity to a major research library--for access to reference and other tools found nowhere else
- location in or proximate to a WESTFORNET service center to assure rapport with the needs of researchers and practitioners
- availability of a local pool of bibliographers, library school students and possible contractors--which has been a factor in the success of the Seattle and Berkeley centers.

Possible location at the WO or the NAL was discussed.

If a fully national system of regional networks were in operation, the central unit might be located at the NAL which provides a library environment. At present, either of these locations is very far from the users. While a national location would bring closer awareness of national information programs and goals and assure equal attention to all Forest Service units, it could also lead to an absence of specific insight into the information needs of on-the-spot practitioners and researchers. Much of this objection would be overcome if the central unit was simply a processing unit, with the selection of *Monthly Alert* materials, as well as general management, remaining at the headquarters of each regional network.

(3). Costs. The equation for determining the costs of moving WESTFORNET's database from the present version of FAMULUS to an on-line system or to FAMULUS 150 (see 6a above and Appendix VII and XV) involve factors not all of which can be pinned down at this time. Using BALLOTS as the basis for the costs of an on-line system, three alternatives merit serious consideration:

- a. go entirely commercial, using BALLOTS and Auto Graphics to produce all outputs
- b. go to BALLOTS for database construction and maintenance and write a program enabling FAMULUS to take a MARC2 tape and produce FAMULUS formats from it for use in-house to produce the WESTFORNET catalog and *Monthly Alert*
- c. develop FAMULUS 150, producing MARC-like formats for NAL while permitting in-house processing for the WESTFORNET catalog and *Monthly Alert*

There would be no new costs for personnel. Costs in terms of start up, operating and production would be:

<u>Start Up</u>	<u>Options, as explained above</u>		
	<u>a</u>	<u>b</u>	<u>c</u>
BALLOTS	\$ 5,000	\$ 5,000	\$
Auto Graphics	1,200		
FAMULUS 150		1,500	6,000
	6,200	6,500	6,000

Annual Operating Costs

Catalog construction and maintenance

BALLOTS	13,000	13,000	
Auto Graphics	1,560		
FAMULUS 150		1,300	8,000*

*Includes part-time programmer

Monthly Alert masters (camera-ready copy)	8,760	4,000	4,000
COM catalogs	<u>6,800</u>	<u>3,500</u>	<u>3,500</u>
	\$30,120	\$21,800	\$15,500

Total 1st Year Costs

+ Annual Operating Costs	\$36,320	\$28,300	\$21,500
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The only other alternative is to make no changes and remain on standard FAMULUS. The annual costs at the moment for production of the WESTFORNET database, catalogs and *Monthly Alert* master copies is \$15,000. However, staying with the present operating system would preclude production of MARC-like tapes: further expansion of the database would very rapidly lead to operational inefficiency.

The cost difference between doing a half-way job by developing FAMULUS 150 versus moving to a fully automated on-line cataloging system producing MARC2 communication tapes for a text-handling vendor is about \$15,000 per year. The Study Team considers the advantages to be gained unquestionably worth this cost.

(4). Funding. Funding of the WESTFORNET central operation now is by reimbursements from the participating Forest Service units. This appears equitable while WESTFORNET is solely a regional network. But, in view of the potential for WESTFORNET's database to serve national needs and other regional networks, the possibility of funding from the Washington Office was considered. This would simplify negotiations and reimbursements among 20 field units. It would insure continuity of funding to the entire operation. It would be in keeping with the WO funding by general assessment those activities benefiting all Deputy areas and field units.

Funding by the field participants, however, preserves regional orientation and control. Individual supporting units know for what they are paying and can evaluate the benefits. Such decentralized funding does consume much executive and administrative energy, perhaps more than the cost of the work to be accomplished.

(5). Impacts on ADP and telecommunications systems. Moving the WESTFORNET database activity to an on-line automated cataloging system will have a negligible effect on Federal ADP and telecommunication systems. WESTFORNET Central would communicate with the system on a leased commercial line using the CRT terminal required by the system. Other WESTFORNET service centers would communicate using dial-up terminals. They already have these and use them, via TYMSHARE or FTS lines, to interact with commercial bibliographic search services. Their additional use of these lines to search the WESTFORNET database would very seldom exceed an hour a week per center, a total increase of three hours per week for the system.

In the 1980's we may want to move into true on-line shared construction of the database, in cooperation with the NAL. Then the other WESTFORNET units would require a leased line and CRT terminals. It is too early in the development of WESTFORNET and the evolution of SOUTHFORNET and parallel activities in the Northeast to include this step in our planning now.

(6). Effects of alternatives for managing WESTFORNET's database on planning for other scientific-technical services. Decisions about WESTFORNET would have no effect on hard data systems, conferencing systems, or administrative information

systems. Existence of WESTFORNET in an on-line mode would have an effect on library planning. But this influence of WESTFORNET already exists. WESTFORNET is an advanced model proposing to utilize the current state-of-the-art in library management. It offers those contemplating SOUTHFORNET or related ventures the opportunity for cost savings and sharing through cooperative action. It should not be prejudicial to any advanced library developments.

The placing of the WESTFORNET database on a given on-line cataloging system does not preclude its later being moved, so long as the database is in the MARC2 format.

7. Recommendations

a. *Technical.*

The following brief restatement of WESTFORNET needs is the basis on which these technical recommendations are made:

(1). Cataloging should meet the accepted national standard and provide for exchange of bibliographic information on magnetic tapes.

(2). Cataloging system selected must permit the design of an input format meeting all the demands placed on the WESTFORNET database.

(3). On-line entry, correction, modification, and deletion of library records.

(4). Facility for on-line searching of WESTFORNET records for reference work and cataloging.

(5). Access through the system to records of research libraries using the system.

(6). On-line access for all WESTFORNET service centers and other cooperating and participating libraries.

(7). Coordination to supply NAL with WESTFORNET records.

(8). Continued timely production of *Monthly Alerts* and COM catalogs.

(9). Production of special publication lists for Forest Service units.

(10). Access to the database by other Federal and private sector users.

The team determined that BALLOTS, with an interface system such as Auto Graphics, is technically capable of processing and storing the catalog and producing all needed library outputs. However, one area which needs further investigation concerns items (1) and (2) above. The problem would not exist if there was not an interest in including tags in the WESTFORNET format for the retrieval of special subsets for non-library purposes, e.g. publication lists and other Forest Service editorial outputs. If further study shows that there are insufficient local information fields in MARC2 format to accommodate tags for these special, non-library Forest Service needs, we would be unable to utilize the MARC2 format and, therefore, be barred from BALLOTS. We would have to fall back on FAMULUS 150 for maintenance of the database. The NAL has solved a similar

problem in their own adaptation to the MARC2 format. We shall require on-line technical consultation with NAL before we can fully determine whether we can move WESTFORNET to BALLOTS.

Therefore, the Study Team recommends that detailed consultations be undertaken with NAL and BALLOTS. If the forming problems are solvable, WESTFORNET should develop an action plan for moving the database to BALLOTS, with Auto Graphics as the text-handling interface system. If the forming problems cannot be overcome, FAMULUS 150 should be developed and utilized.

b. *Managerial.*

Distinction must be made between recommendations about the over-all management of WESTFORNET, as a special library network, and technical recommendations about the WESTFORNET database. The two topics are inescapably linked. But the former should be the subject of a separate study concerned with the structure and governance of library networks in the Forest Service. The present Study Team would require additional members with different skills to do that.

However, requirements for a library database for any such network are quite clear. They stem from the national evolution of library automation and the known requirements for WESTFORNET. Therefore, the Study Team considers that the immediate need is to establish a technical support configuration for the WESTFORNET database, as recommended in a above. The database would then be capable of expansion to any foreseeable size and would have the capacity to support any eventual national system. It would also be able to interface with international systems.

Possible other locations and arrangements for management of the database have been discussed. For the next two years, while the details of its method of operation are worked out, there seems nothing to be gained by moving the activity from its present location. It is in the hands of personnel who are intimate with its peculiarities, its contents, and service potentials, and who have the expertise and commitment to effect the required change either to BALLOTS or to FAMULUS 150.

Decisions about future location and management of WESTFORNET Central will be influenced by developments in SOUTHFORNET, in the Northeast, and the WO. Being unable to anticipate those decisions or to wait upon them, we recommend that technical changes in WESTFORNET's database should proceed under the present management of WESTFORNET Central.

APPENDIX I

History of the development of WESTFORNET

Developments leading to the establishment of WESTFORNET on May 8, 1978, began at the PSW Station, Berkeley, in 1970. A 1968 Forest Service program review concluded that the results of Forest Service research were not being effectively transferred into practice on National Forests in California. The Forest Service had been aware of this for some years, not only in California. A meeting of the PSW-R5 Region-Station Communications Committee in 1970 proposed a move to increase quickly the transfer of technical information to practitioners on the forests. This was to extend the Station's technical library information services to the R5 forests. The Klamath National Forest in northwestern California was selected for a trial.

The PSW Station, pioneering in utilization of new library and information handling techniques, already possessed a computerized catalog and produced a monthly alert to new literature with species and subject indexes. This service, plus general document delivery from libraries, special reference services and other information services were offered to the Klamath at once.

After user orientation sessions were held at every Ranger District, as well as in the Supervisor's Office, the service began. It was well-received. In 1972, the service was extended to three more California forests. The service to four forests continued for about one year. By 1973 the Region-Station Committee concluded that the existence of a real and continual need by professionals in R5 for technical library services had been demonstrated. They recommended an expansion of service to all forests in the California region. This began in the Spring of 1973 under the name CALFORNET (California Forest Research Information Network).

The Pacific Northwest Region and Station of the Forest Service had information transfer problems of the same order as those in California. In 1974 the Station concluded that the traditional field library at Portland was not meeting its needs. The positive reception of CALFORNET was brought to their attention. In June 1975, following intensive planning, Pacific Coast-wide services, called PACFORNET, were introduced to the national forests in Oregon and Washington (Region 6), to Alaska (Region 10), and to the research staff of the Pacific Northwest Forest and Range Experiment Station. The northern units were serviced through a contract unit located in the Forest Resources Library of the University of Washington, Seattle. This geographic expansion of service and creation of a new service center made maintenance of the database and production of required outputs more complex.

General Functional Inspections in the Rocky Mountain and Intermountain parts of the West recommended to affected units of the Forest Service that they evaluate and consider applying concepts exemplified by PACFORNET. In 1977 the PSW Station led a full-scale evaluation of PACFORNET and included all Forest Service units in the West in the process. Representatives from the Western Regions and Stations, as well as representatives from the North Central Station, Northeastern Area, and the National Agricultural Library, met in Berkeley to study the evaluation. Following orientation and review sessions in Berkeley, the Review Team split up into small groups, visited field locations, mostly on National Forests, and talked with PACFORNET users. Reconvening at PACFORNET NORTH in Seattle, the Executive Review Team considered all findings, and recommended the expansion from PACFORNET to WESTFORNET.

Regions 1, 2, 3 and 4 and the RM and INT Stations were added to the network on May 8, 1978. Services in the added area are based on the Forest Service libraries at Ft. Collins, Colorado, and Ogden, Utah, with resource support from cooperating land-grant university libraries.

Expansion of the service area brought new complexities to production of the *Monthly Alert* and maintenance of the WESTFORNET database. We now had to prepare four geographic editions, each slightly different. In addition, coordinated cataloging and ordering of materials became necessary. The database in effect was a Union List of WESTFORNET's holdings in three Forest Service libraries and two University forestry libraries. These developments made quite urgent a long-realized need to search for a different system for managing the database.



APPENDIX II

History, present status, and uses of the WESTFORNET database

The PSW Station library was authorized in 1959 and began operation August 22, 1960. It was in the first year of the decade which saw truly revolutionary technological developments that make present-day information services possible. It was only two years after the 1958 *International Conference on Scientific Information* held in Washington, D.C., under the sponsorship of the National Science Foundation. The Conference's two volumes of Proceedings were, and remain, a summation of all that was known up to that time about problems of scientific information, particularly organization and dissemination, and about needs of the users of scientific information--a topic previously almost entirely neglected in the theories of library organization.

PSW's new library was directed by Station management *not* to create a library catalog modeled on the traditional university library dictionary catalog. Station researchers had long before abandoned hope of using such a tool for any kind of subject searching. Thus, library planning at PSW was from the start focused on the new and impending developments in scientific information handling. The *Proceedings* of the 1958 conference became a planning guide for the first several years.

Until 1964 manual systems for technical libraries were explored, principally the Oxford system, in which there was great interest at the Washington Office level of the Forest Service. But by 1964, the Station was far enough into computer activities to consider automating the library catalog. These efforts cumulated in the FAMULUS programs--very likely the most successful and widely used small documentation system yet designed. FAMULUS was intended to manage the relatively small files of individual scientists, to handle special bibliographies, or to automate the combined files of a research project. A particularly important feature was the great simplicity of the citation input format, compared to the complex and user-fatiguing input formats of other mid-1960 documentation systems. The original FAMULUS had a low file size limit (ca. 10,000 citations), only ten machine-readable fields or data elements, and the capacity of the index program was 2,000 descriptors referenced a total of 2,500 times.

Still FAMULUS could handle the size of the PSW library catalog in 1964 and could produce all required outputs. File size and indexing limits would not be a problem for several years. When the computer centers used by PSW replaced older equipment, higher-density tapes and multi-reel files became available. FAMULUS was modified to enlarge the index program. More recently, to accommodate abstracting databases such as FIREBASE and PLANBASE, the limit of characters per citation was increased from 4,000 to 13,000, while the number of machine-readable fields or data elements was raised from 10 to 150.

FAMULUS is now able to produce the four regional editions of the WESTFORNET *Monthly Alert*. Output is directly on to unlined paper, which is used as camera-ready copy by the four WESTFORNET service centers. Each center makes its own local printing arrangements. The SORT and MERGE programs of FAMULUS produce the WESTFORNET author, title, series, shelf list and location-assignment catalogs from the cumulated master tape. These are available on paper or microfiche. The database is searched by the SEARCH program, using Boolean operators

While WESTFORNET can continue to use FAMULUS indefinitely, performance and cost penalties are suffered. Maintenance and production of the WESTFORNET data-

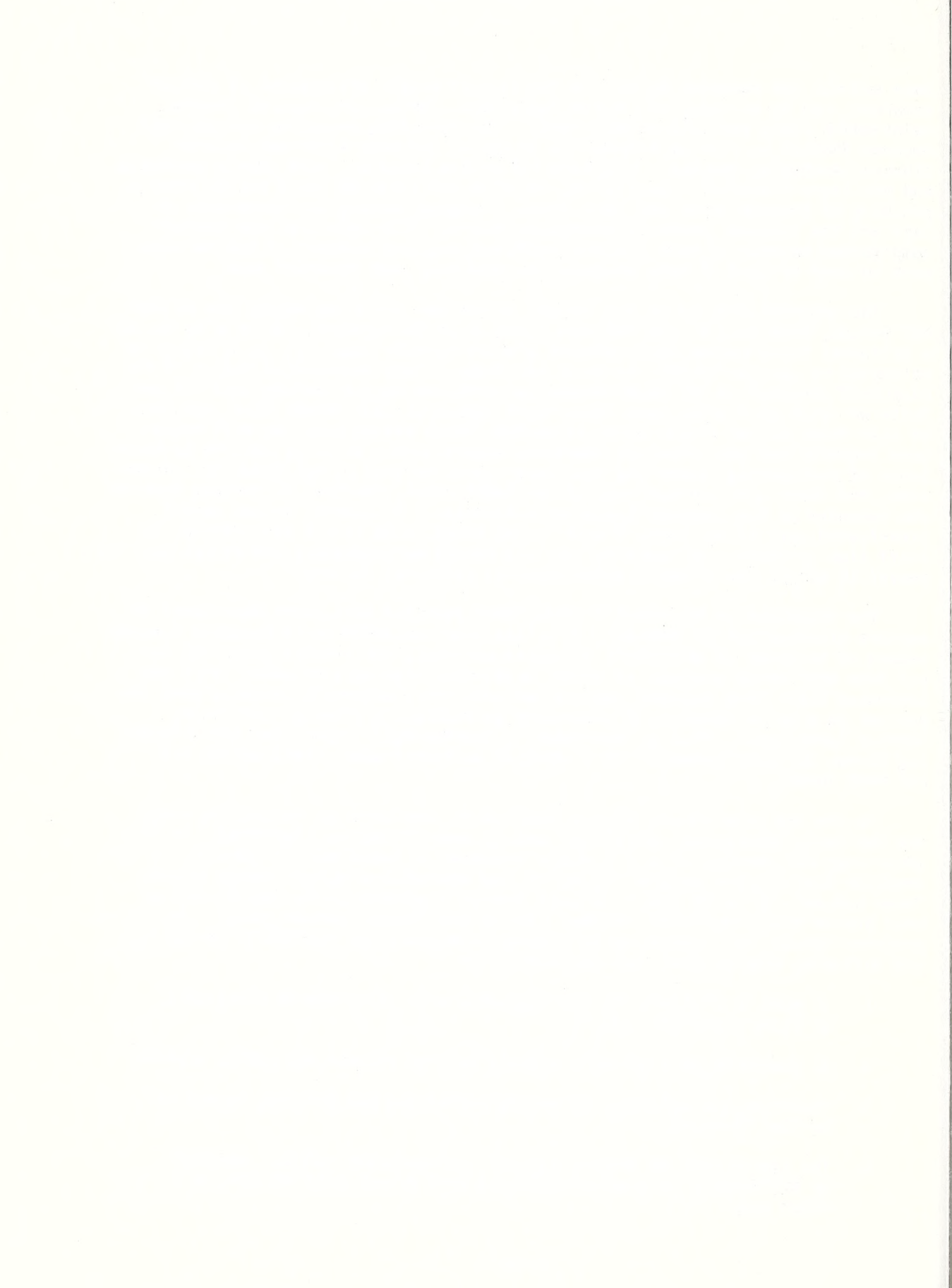
base and all its required outputs is the largest single utilization of FAMULUS anywhere, and by an order of several magnitudes. Hence, the cost of program maintenance falls entirely on WESTFORNET. The operating penalties are incurred because FAMULUS is a batch program--in an age of far more efficient on-line library cataloging systems. Important off-system steps are only partly automated and are labor-intensive; data entry, deletion and citation modification require punching of program cards and input decks. Program loading and turnaround delays are the frequent cause of production delays. File updating, now further complicated because of four slightly different regional subsets of the database, must be done by lots of tape manipulation requiring many computer runs.

The eventual need to go to a larger system was perceived during the CALFORNET period, when only R5 and PSW were involved in the network. In 1974 we tested a different batch system which offered greater overall capacity. As a trial, we attempted to use the ORCHIS system at Oak Ridge. They converted a sample of the CALFORNET database to the ADSEP format and produced sample catalogs and indices. While we could gain upper-lower case output capability and larger file capacity, we also found we had simply moved to another batch system with the work being done remotely and away from our immediate supervision. We still had the in-house labor of keypunching, preparing card image tapes to send to Oak Ridge for conversion, and then, upon receipt back of the ADSEP tapes, the task of running them on the computer at the Lawrence Radiation Laboratory. In effect, we had merely transferred part of our FAMULUS work to Oak Ridge, with little real savings in staff time or costs. In addition, pricing proved unpredictable and errors appeared in output due to many, often obscure, technical factors.

The expansion of PACFORNET to WESTFORNET required management once again to explore alternatives to FAMULUS. At a time when the database is becoming a union record of holdings in WESTFORNET libraries and has great service potential for all four WESTFORNET centers, it is not available in an on-line mode. With the increased input from regional service centers, the database is becoming more important as a major resource of literature pertaining to forestry and Forest Service operations. This in turn makes it increasingly urgent that the cataloging format be made compatible with standard machine-readable cataloging, e.g. the MARC format.

In the few years since 1974, systems which then were in the testing stage are now fully operational and widely used by many libraries. WESTFORNET is an inter-regional network of a size where economies of scale make it feasible to consider shifting its database to an on-line shared-cataloging library system. These systems, of which there are only several available in the United States, have proven their capability to meet library and library network needs. Any proposed system, or combination of systems, considered by WESTFORNET should have the following capabilities and characteristics.

1. It must be designed for bibliographic work, with shared cataloging at least a possibility.
2. It should be on-line and available to both private and public sectors.
3. Inputting and updating (including correcting and editing) should be on-line features.
4. The system must be able to produce the necessary outputs required by WESTFORNET, or readily interface with a text-printing system which can.



Use of the WESTFORNET database at present is most heavily made by the professional employees of the seven regions and four stations contributing to the network costs. In addition, several hundred State and private sector foresters have access to limited services, mainly the *Monthly Alert*. Over 30 Western libraries receive microfiche copies of the WESTFORNET database in the form of author, title, and subject catalogs. The value of the database as a key to printed materials cogent to forest and wildland management lies in a certain uniqueness of its contents.

Our experience, which is corroborated by research in the literature use habits and needs of various kinds of professionals, has shown that practitioners and engineers are keenly interested in published materials called "grey literature" or ephemera. This material is topical, application oriented, and often of only temporary value. These materials are almost never collected by libraries or found in library catalogs. Where they are collected, in special collections, they are still not found in the important indexing and abstracting services. Awareness of and access to these resources among practitioners, especially in field situations, is very minimal.

WESTFORNET librarians make special efforts to collect these materials and get them into the *Monthly Alert* and thus into the database. A check by the National Agricultural Library of the *Monthly Alert* for 1977 produced an estimate that only from 48 to 55 percent of the materials found in the *Alert* would ever have been eventually acquired by the NAL.

WESTFORNET's acquisitions policy, being basically user-oriented, changes as Forest Service research and management programs change. This is very different from the acquisitions policy of major research libraries, government or academic. Their policy, as exemplified by that of the National Agricultural Library, is comprehensive coverage in various announced subject fields. Though not indifferent by any means to user needs, they are basically oriented toward archival perservation and availability of the permanent literature. WESTFORNET, of course, relies on such research libraries to meet many user needs for this very reason.



APPENDIX III

Potential applications of database

In the next several months, as the expansion to WESTFORNET passes through the shakedown period, the WESTFORNET database:

1. will become a cooperatively constructed regional literature resource, with orientation to Forest Service and forestry programs and problems in the West;
2. will emphasize non-journal literature, but with regular scanning of about 30 journals for key articles of special interest or application;
3. will contain *all* Forest Service-sponsored publications, including those in journals or open-literature;
4. will catalog each document as a "separate" with the subject, species, geographic and other necessary terms that provide effective indexing handles, thus making the database a more intensive searching tool than regular library subject catalogs;
5. will show the location of each document in each library holding it;
6. will include publications from all parts of North America, or from elsewhere, that have either general or specific relevance to Western forestry.

A database of this size and scope may contain as much as 75 percent of the "non-journal" forestry literature produced in the United States. Missing is systematic monitoring of the regional, local and species-specific literature of the Northeast and the South. The planners for SOUTHFORNET and of a potential NORTHEAST network will find that the WESTFORNET database, while lacking much of their regional literature, will have a high percentage of the general literature of interest to their users.

Potential is here for national forestry literature coverage, through cooperative augmentation of the existing database. Such an effort could be undertaken by three regional forestry information networks, using a common format and accessing a common processing system from locally-operated terminals. Regional *Monthly Alerts* would be produced, as now in WESTFORNET, from subsets consisting of the special input of an individual center plus the monthly acquisition of general forestry materials. The entire database could be searched by anyone having access to the operating system.

A specialized forestry database the size of WESTFORNET calls for the consideration of cooperative cataloging with the National Agricultural Library. At present the NAL includes in AGRICOLA, its general agricultural database, only about 48-55 percent of the forestry materials we announce in WESTFORNET. By developing coordinated cataloging responsibilities, NAL could reduce coverage of material which WESTFORNET catalogs and accept the input from us. Savings would be realized, the completeness of the AGRICOLA file would be enhanced, and the important regional slant and emphasis of WESTFORNET would be retained.

With complete coverage of Forest Service publications, the WESTFORNET database becomes a resource for several Forest Service editorial and reporting func-

tions. It should contain all or nearly all of the citations needed for the production of *Research Accomplishment Reports*. The WESTFORNET input format can include a code field which would permit extraction from the database of a subset containing *only* Forest Service publications of a given year. Similar codes can be used to produce annual or cumulative subsets of each unit's publications.

Another potential value of the WESTFORNET database relates to the public sector. In the family of environmentally- and ecologically-oriented databases available for public literature searching over commercial literature search services, there is a niche uniquely filled by WESTFORNET. No other database of potential interest to state and private forestry contains the same slice of literature, organized around the needs of forestry and wildland management, indexed with a subject terminology based on current usage of forestry practitioners. The WESTFORNET database can be made available over commercial systems--either by special arrangement with a vendor (as is *Forestry Abstracts*) or by riding NAL's contracts with its commercial vendors.



APPENDIX IV

Relations to other Forest Service and Federal Agency citation databases

The WESTFORNET database has an independent relation to a small family of Forest Service citation databases. These latter were all constructed under direction of the Technical Information Office and a cooperating Washington Office research staff. WESTFORNET was built in the field by PSW; it is the only citation database in the Forest Service which is also a library catalog.

The Washington Office-directed databases are small, mission- or narrow-subject-oriented files constructed since 1972. They are mostly in the RRTIS (Renewable Resources Technical Information System) format. The RRTIS format was designed by the TIO to encompass the needs of indexing and abstracting databases without, at the same time, being incompatible with those of libraries or selected Washington Office editorial and research reporting citation needs.

Four of these files are available for use on the ORLOOK program, an on-line string-search system maintained by the Department of Energy at Oak Ridge, Tennessee. These are:

Spruce Budworm Index	ca. 2,000 records	✕
Gypsy Moth Index	ca. 3,590	"
FIREBASE	ca. 3,770	"
PLANBASE	ca. 3,100	"

TOTAL ca. 12,460 records

Five other Forest Service citation databases are now, or at some earlier time were, available on ORLOOK for trial purposes only:

Index to <i>Journal of Forestry</i> , 1951-	3,100 records	✓
Index to <i>Journal of Range Mgt.</i> (all)	2,500	"
Index to <i>Forest Science</i> (all)	1,130	"
<i>Research Accomplishment Reports</i>	6,000	✕
<i>Dwarf Mistletoe Index</i>	8,000	"

TOTAL 20,230 "

GRAND TOTAL 32,960 records

Managers of some of these databases, such as FIREBASE, can furnish copies of the materials indexed; however, none of these databases represent the organized holdings of a library. They are primarily indexing and abstracting tools, whose end products are the citations produced. Some contain lengthy digests which hopefully are sufficiently informative to serve the user in lieu of a copy of the document itself. The public utility of these databases will be greatly increased if they can be put up on systems which offer public access. Then businesses, other organizations, forestry schools and state and local agencies who already use on-line terminals to access those systems, would benefit directly from the Forest Service effort.

The WESTFORNET database is not immediately compatible with the RRTIS format. Operators of the smaller databases are unable to merge desired citations from WESTFORNET tapes with their own files. However, all of these Forest Service files

can, and perhaps should, be put up on any one, or more, of the commercially-available literature searching services. Then the files could be searched in common on many of their data elements even though their actual input format differs.

Several Federal agencies, notably in the Department of the Interior, support programs with information needs which closely parallel those of the Forest Service. Many of these collegial agencies maintain citation databases. Most have indexing and abstracting services, but some have automated library catalogs (especially in EPA and DOE). The WESTFORNET database contains citations and subject organization of interest to these agencies, and this relation is reciprocal. If the WESTFORNET database were in a format which permitted interface with the other databases, information interchange could be expedited.

Unfortunately, all these databases operate on a variety of different systems using different citation formats. The division is about equal between those using a MARC or MARC-modified format and those with a COSATI or COSATI-modified format. (See Appendix V.). The databases closest to WESTFORNET in subject coverage are in Interior and Agriculture. These are MARC-oriented. The National Agricultural Library is committed to MARC format beginning January 1979. Preliminary discussions have taken place between WESTFORNET and NAL about conversion of the WESTFORNET's present format to MARC. A further advantage, if WESTFORNET were to convert to MARC-format, would be the ability to provide input to AGRIS--Forestry through NAL's AGRICOLA-AGRIS conversion program.

Another area of potential WESTFORNET interface is with the National Technical Information Service (NTIS). The Forest Service has been interested for some time in facilitating the input of its research publications into the NTIS system for inclusion in their publication *Government Reports Announcements*. NTIS is one of the information services which uses the COSATI input format. However, the NAL has a conversion program from their present format to one which the NTIS will accept. Thus, making WESTFORNET compatible with NAL would open the door to compatibility with NTIS.

The remaining collegial agencies whose subject coverage parallels that of WESTFORNET adhere in the main to COSATI or to COSATI-oriented formats. A review of the format compatibility or interface potential of WESTFORNET and related Forest Service and other agency databases reveals many technical problems and some serious incompatibilities. The easy optimism with which tape interchange between different systems is often approached dissolves, under a closer look, into a series of specific, frequently ineluctable, problems.

But it is surely a strategic error to attempt to evaluate the relation of the WESTFORNET database to other citation databases within the Federal family on a narrowly technical basis. It must be measured on the value of its contents, their organization and the services provided from it. The database exists for the primary purpose of special library resource management where the selection of resources (and, hence, database content), both in terms of building the database and providing services from it, are determined by user needs. The applied and specialized nature of these needs has resulted in a technical library network--WESTFORNET--which has no counterpart in the government, academic or private sector. Relevance to the defined user audience is the fundamental justification for building of the database and the services it provides.



APPENDIX V

The citation format question: MARC or COSATI?

The library and documentation professions in the United States have evolved two basic formats for citations in computerized cataloging operations. Both formats are national standards. They are found in the *American National Standard for Bibliographic Interchange on Magnetic Tape, ANSI Z39.2*, issued in 1971. The MARC format is in Section A2 and is titled *Preliminary Guidelines for the Library of Congress, National Library of Medicine, and the National Agricultural Library*. The COSATI standard occupies Section A3 as *Proposed Preliminary Cosati Guidelines for the Implementation of ANSI Z39.2*.

Leadership for development of MARC (Machine Readable Cataloging) rested with the Library of Congress, which set up the MARC Development Office. MARC formats, as they have been developed, are used in the preparation of Library of Congress cataloging records for computer manipulation. Because of the pre-eminent role of the Library's cataloging services in American librarianship, academic and research libraries undertaking automation are necessarily drawn to the MARC standard.

The COSATI format has an entirely different genesis. It is a product of the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology. Its purpose is to standardize the cataloging of technical report literature, largely a post-World War II phenomenon. With various modifications, the COSATI format is used by agencies operating indexing and abstracting services for the technical report literature.

The descriptive cataloging of scientific and technical report literature borrows much from traditional library cataloging. But reports emphasize data elements not necessary in citations to other literature. These elements are notably contract numbers, agency-assigned accession numbers, security grade classifications, originating or monitoring agency, and statements concerning limits on availability or distribution. The rules for establishing corporate entry are different from those of the Anglo-American code used in most libraries. The general citation format differs radically from that found on library records.

Yet these formats are not rigidly exclusive in practice. A librarian can catalog a technical report using the MARC format and the Anglo-American code. Conversely, trade and journal literature can be massaged into the COSATI format. Materials cataloged in both formats can even be mixed in a catalog, but at the risk of some confusions and misunderstandings by catalog users. Since WESTFORNET acquires technical reports, the question can be raised whether adaption of the COSATI format might not have some advantages?

If the WESTFORNET database and the libraries cooperating in its construction were entities unto themselves, the question could be decided either way, though even under those circumstances the MARC format would without doubt be found the more acceptable. But technical reports are a small minority of WESTFORNET's acquisitions. WESTFORNET libraries acquire mostly trade books, research serials, and journal literature. These libraries and all the libraries with which we interact and exchange information use the Library of Congress/Anglo-American Cataloging Rules to which MARC is oriented. The national bibliographic systems (OCLC, BALLOTS, WLN) on which libraries increasingly rely for cataloging information all

insist on MARC input formats. And the National Agricultural Library is scheduled for conversion to MARC format as of January 1, 1979.

There appears to be no measurable advantage for WESTFORNET to consider the COSATI format if a system change is made. It's use would complicate our relations with existing cooperators and cut us off from enjoying the benefits of important support systems.



APPENDIX VI

Field Interviews By James Clarke

During the week of May 21-26, 1978, I contacted the following heads of information and library groups and their staffs in the Washington offices of several government Departments and agencies and at the Oak Ridge National Laboratory:

JEANNE HOLMES, Deputy Director, Resource Development, National Agricultural Library; also, VERN VAN DYKE, Systems analyst and DAVID LEE, Procurement, both of NAL;
SARAH KADEC, Chief, Library Systems Branch, Environmental Protection Agency, and CAROL ALEXANDER, assistant to Ms. Kadec;
MITCHELL KRASNY, Information Handling Systems Officer, National Technical Information System, Department of Commerce;
MARY HUFFER, Director, Library Services Office, Department of Interior; also, PHILLIP HAYMOND, Field Services for Interior;
LEE POWER, Program Analyst, Federal Library Committee;
AL BROOKS, Union Carbide Corporation, contractors for the Department of Energy and operators of the Oak Ridge National Laboratory.

I briefed these people on our own work, the operations for WESTFORNET, and the purpose and scope of our study. At the same time, I asked for their comments and advice on our plans for changing the mode of our computerized operation.

Monday, May 21, AM: NAL

Discussed cooperation and need to work out mutual coverage of literature to possibly provide our cataloging of some forestry literature to NAL. Pointed out the need for us to be compatible with their operations, i.e., compatible with MARC. Mrs. Jeanne Holmes described the work they completed, analyzing problems of converting to MARC from NAL's internal formats, and assured that we would find places in the MARC format for all of our local needs. She outlined NAL's plans to convert entirely to MARC for the library catalog and to close the card catalog by 1980.

Van Dyke told me of NAL's examination of bibliographic printing software and purchase of SAMANTHA for their use. It will be used to convert from MARC to allow production of their current outputs: the AGRICOLA file, and the NAL catalog. Van Dyke explained that SAMANTHA was available for Departmental use. It would be on the Washington Computer Center and users would be expected to do the processing with the language by remote batch.

Mrs. Holmes also assured us that the MARC format for books is the correct one to use for technical reports and monographic series. Also, that there are two new MARC formats which will be released in the near future: one for analytics and journal articles and one for technical reports, which would include facility for abstracts. Also explained was NAL's cooperation with AGRIS. AGRIS is being flexible and cooperative in making use of NAL's cataloging without demand being made on NAL for duplicate cataloging to AGRIS-standards. This would be a subject for further discussion with NAL to insure that our work met their requirements for AGRIS.

Later Monday, I talked to the people at EPA. Ms. Kadec and Ms. Alexander briefed me on the work they do indexing and abstracting large amounts of scientific-technical literature for several databases they maintain, as well as their library catalog. We immediately got into a discussion of the split over format



for cataloging between indexing/abstracting services and libraries. EPA uses the COSATI format. This argument is further explained in another section of this appendix. Kadec recommends the COSATI over the ability of MARC (and LC rules) to handle their special documents, but she also feels that their format and operating methods are appropriate for their library work. Ms. Kadec explained the operation of their system for input. They use a mini-computer and an on-line temporary storage and retrieval system which prepares files for conversion and later merging with the master files of their databases. Book catalogs are later printed for the library from that base. They plan to re-program another mini in the near future to take over the same input functions. Kadec would recommend this same kind of input system with book catalog production. They currently have a book catalog, un-accumulated, in three volumes with plans to merge these soon. They would recommend the purchase of the mini-computer for \$90,000, which would be used to prepare input files to be put up on some on-line retrieval system. Ms. Alexander pointed out that we could only choose bibliographic format and cataloging rules after we had thoroughly examined our needs and decided which of the contrasting groups, either library or sci-tech. abstracting, we most wanted to resemble.

Tuesday, May 22: Aspen Systems, Incorporated.

Mr. Sperling Martin told me of the work of Aspen in publishing from machine-readable bibliographic records of printed bibliographies and other books prepared from computer-processed photocomposition. He told me that they had experience in using SAMANTHA and would be able to produce our *Monthly Alert* in its four forms with indexes from tapes in MARC or other formats. They have already used tapes in MARC format with SAMANTHA.

Mitchell Krasny, of NTIS, talked to me that afternoon and detailed the features of their system--the use of a modified form of the COSATI format and their own retrieval software. Entry into the system is similar to the operations at EPA. In fact, Krasny had the same recommendation about a \$90,000 mini-computer system used for preparation of input files which could be merged with a master file on some retrieval service system. He explained that they converted from the entry database to their version of COSATI and then merged with on-line files. He was interested in our idea of cooperation by providing tapes of input for them of Forest Service document citations, but noted that perhaps their non-standard format and cataloging rules would make it difficult even if we chose the standard COSATI form of cataloging.

Wednesday, May 24: Department of Interior

Mrs. Mary Huffer briefed me on their plans to continue their work using the OCLC system and expressed hope that we would choose a system using MARC since our work, in many areas, was similar and might provide the opportunity for cooperation. Mrs. Huffer asked several questions about WESTFORNET: how much journal literature we selected; what, in general, were our criteria for selection for the *Monthly Alert*; and how this would change with the coverage of the new portions of WESTFORNET. I will arrange for her and Signe Larson, of her staff, to discuss these items with Vincent Aitro. She was satisfied, as were the people at NAL, that we could handle technical reports in the MARC-book format.

Wednesday, May 24, PM: Federal Library Committee

Mr. Lee Power described details for the use of the SCORPIO retrieval system and how it works for the Congress. This system is practically only a curiosity, since the Congress will not let others use the software, nor will they allow much use of their retrieval system. Only NAL and DOE have access to the database.

Discussions of the Fed-Link network, operated by the FLC, revealed that 137 Federal libraries use the OCLC system. Ten other Federal libraries use OCLC (WESTFORNET being one of them) through other networks, TYMNET, etc. There is a discussion of our limited use of OCLC in another section of this appendix.

Friday, May 26: Oak Ridge

Mr. Al Brooks described the ORCHIS system and the operation of their shop in keeping RECON files updated. Al Brooks' shop operates on an extremely low budget and, for the money expended, they feel efficiently. They are plagued by an old and ailing IBM 360/75 which was never meant to operate under TSO, the time sharing operating system, which interfaces users of RECON and ORLOOK. They may have new equipment but it will be two years away. He explained that their plans for data entry will be handled by some as yet unselected piece of general purpose management data-type storage and retrieval system which would be used to prepare files to be merged into the ORCHIS linear files. He and Frank Hammerling explained that their organization is set up to provide support for the system but minimal time is available for extra work such as special handling of user data. They were more used to users who would manipulate their own files for special purposes either by user personnel stationed at Oak Ridge or by remote batch interface. Oak Ridge has no plans for on-line entry of data directly into a library-like system. One drawback to using RECON as a site for more sophisticated search and retrieval of a database is that they are not in a position to allow the use of RECON by the private sector in competition with commercial systems which might have the same database. Documentation for ORCHIS is simply not available and is some months away still.

APPENDIX VII

Possibilities for Expanding and Utilizing FAMULUS

In case WESTFORNET must continue to rely on FAMULUS to maintain its catalog, much of the operations would remain the same. However, our need to cooperate with the NAL would remain. This would require that we close the present catalog and begin entering new material in a MARC-like format.

We have been referring to the latest version of FAMULUS as FAMULUS-150. The original FAMULUS programs allowed only 10 fields for data entry. A recent modification to the program has raised this to 150 fields. Although not a major change, this was an important one, for it allows a more complicated citation format.

Although FAMULUS is not principally used by libraries, most of the changes in our version have been made in response to the needs of PACFORNET and WESTFORNET. Changes have been made either to overcome shortcomings in the original programs, or for different treatment of citations, or for different forms of output. A change in direction, such as the proposed new cataloging, will require further changes. Although the number of fields which will be needed is physically possible, the full use of those fields will require modifications to allow upper and lower case letters and changes in the routines which determine alphabetization. This latter will be needed to allow for a more complicated selection of sort keys from the citations. Consolidation of several other changes which have been placed in temporary versions of some of the programs should be completed, and a program which prepares a dictionary catalog should be finished. A dictionary catalog is one which lists all entries in the same listing, i.e., where the entries for author, title, series, and subject are interfiled. This program was recently added and has been tested for all but the subject headings and authority references.

Further changes would involve input to the programs. Input in the past has been with cards because of the lack of interactive capability of the system we use. We can, with a little work, use our remote batch terminal interactively to prepare files which can be created through a low speed terminal onto tape and can be transmitted to the central site. Two other areas might require some programming: (1) preparation of special files for the NAL might be necessary rather than sending them the internal format of the FAMULUS tapes: and (2) output files for the *Monthly Alert* photocomposition rather than continued reliance on the poor qualities of a high-speed line printer.

FAMULUS was originally distributed in versions for three manufacturer's computers: the CDC 6000, the IBM 360, and the Univac 1100. PSW has been using and modifying the CDC version. However, the major change made was to incorporate the enlarged capacity of the INDEX program from the University of Wisconsin version. This change has also been made to the IBM version plus all of the recent changes PSW has made. We have given this new material to SEA-TIS for use on the IBM 360 at Beltsville. The programs and their operations are not dependent on computer site in case of a move of operations. PSW uses the present site and CDC 6000 because of price and service features which are favorable. Programs which produce files for the COM devices are presently oriented toward the COM features at the current site, but COM service is available elsewhere and not dependent on the central computer.



APPENDIX VIII

Cataloging Requirements

INTRODUCTION:

The purpose of these cataloging criteria is to set standards for making a bibliographic record intelligible to potential users of the database. They are designed to assist specialists involved in document delivery, permit customized manipulations of the data to produce a variety of printed and machine-readable media, as well as assist administrators and managers in the decision-making process. In preparing a record for the WESTFORNET database, both the physical form and intellectual content of the material in hand will be analyzed to permit later identification and retrieval with an acceptable degree of precision.

The cataloging effort can be cost-effective only when user needs and satisfaction are placed above theory. We are taking the position that no single cataloging code meets all the WESTFORNET needs, but features from several must be incorporated as is appropriate.

I. DESCRIPTIVE CATALOGING:

The purpose of descriptive cataloging is to distinguish one work from another and also from other editions of the same work. The nature, scope, and bibliographical history of the work might be explained. The essential elements are:

- A. Title proper
- B. Parallel title
- C. Other title
- D. Statement of authorship
- E. Edition statement
- F. Statement of authorship relating to edition
- G. Place of publication
- H. Publisher
- I. Date
- J. Place of printing and printer
- K. Number of volumes and/or number of pages
- L. Illustration statement
- M. Size and accompanying materials
- N. Series
- O. Numbering within the series
- P. Subseries
- Q. Numbering within the subseries
- R. Notes

Definitions of these elements and rules of their use can be found in Chapter 6 of Anglo American Cataloguing Rules-II. However, the rigorosity with which these rules will be applied and the ordering of these elements in a citation will have to be fit to the software package selected and intermediary manipulations required to produce end products.

II. SUBJECT CATALOGING:

The purpose of subject cataloging is to analyze the intellectual content of an item and put together things or ideas which are alike and keep separate those which are different. A sophisticated retrieval system allows subject retrieval by a number of categories. We propose:



A. Controlled subject headings. These may be derived from an existing list, or uniquely developed. The current WESTFORNET database utilizes index terms drawn out of various subject thesauri as well as literature in hand. At the moment, the up-to-date terminology and specificity of the database vocabulary makes it exceedingly useful, as judged by the many favorable comments received from users.

However, purists can find fault with the fact that it is not fully controlled and that it shows the inconsistencies of more than one indexing policy. Moreover, whenever two or more word lists are used, there is the problem of properly integrating their hierarchical concepts. This has not been done as successfully as it might have been due to limitations on staff time. Since it will simply be impossible to develop a proper thesaurus in the time given to begin database production, we propose the following possible options:

1. Continue the existing word list. There are several hundred "see", "see also", and "see from" references in the WESTFORNET authority list. The list, therefore, is very usable in its present form, although it is hardly suitable for publication without adequate review and revision. In theory, it can continue to be refined until it becomes truly controlled and hierarchical. During this interim period, a temporary vocabulary with updates can be given to the heaviest users of the database.

2. Use Library of Congress subject headings for non-forestry topics and the *Forestry Abstracts* annual index word list for forestry concepts. The advantage here is the immediacy of the solution, but any one familiar with these lists knows that it may not be an improvement on what we already have. Its primary advantage is it will be absolutely controlled. Its disadvantage is the preponderance of English (i.e., non-American) usage and the inability of LC subject headings to adequately cover other areas of science in the detail required by users. Another disadvantage is a fair amount of time will still have to be spent integrating the two lists as some concepts will still be found in both, but this effort will still be considerably less than developing an original list from scratch.

- c. Begin a crash program to develop the Mitchell-Kenyon *Forestry Controlled Vocabulary* into a usable list. The Forest Service's Technical Information Office presumably has received comments for its improvement and further development, so a reasonable start is already underway. Integration of the list with non-forestry vocabularies will still be a time consuming task, however.

A philosophical question here to be answered is "Control at What Price?" There is an inverse relationship between natural language user questions and the inflexibility of a theoretically arrived at controlled vocabulary. Why sacrifice our user-oriented word list for one which was intended for a more general audience. Can WESTFORNET users live with the existing Quasi-Controlled Vocabulary until a more satisfactory one is found? There is much evidence that they can.

B. References. "See" references in an index allow the user to understand the hierarchical arrangement of concepts, eliminate synonymy, and call attention to related concepts. Ideally "see" references are interfiled with the controlled vocabulary. Library lists do not use the BT (Broader Term) references which are found in a thesaurus. Current and proposed indexing practice would use:

1. "See" references to guide the user from a heading which is not used as a valid subject term to one which is.



2. "See also" references to guide the user to more specific concepts or related concepts.

3. "See from" references to be used only in the WESTFORNET subject authority file and not printed in the hardcopy indexes. "See from" references allow the indexer to examine pointers to any given term being considered.

If the system cannot interfile these references with the vocabulary, a separate list of them will have to be supplied on demand.

C. Identifiers. These are uncontrolled index words to be added to a citation when the existing controlled concepts do not suffice to describe adequately the subject matter in hand. They are particularly useful in bringing out new jargon and provide a means to deep index less important concepts contained in the paper. Since hardcopy indexes are never produced from identifiers, this will be exploited in machine searching principally. Identifiers are not currently employed by the database.

D. Category codes. Category codes have two functions: (1) arrange the documents into broad topical headings, and (2), ease machine searches of broad topics. A proper category code saves a searcher from entering dozens of keywords.

The current "Forestry Topics" and "Allied Topics" on the *Monthly Alert* are adequate enough to arrange the *Alert* into a coherent order, but they do not suffice to provide a vehicle for machine searching. They simply were not designed with that purpose in mind. A workable category code list for non-forestry topics could be easily developed by the WESTFORNET input center since the quantity of this literature is relatively small and a few general ones should be sufficient. The list for forestry concepts will require a great deal of detail. Fortunately, an extremely well thought out list exists, and if the publishers permit its use, it could be adapted. The new *FA and FPA Subject Headings and CTS Number Codes*, issued in January 1978 by CAB, contains all the detail necessary to make this category code feature work well. The only change necessary would be to use some American terminology in place of the English.

E. Species names. Species names and genera will be input for plants, pathogens, and insects. However, Latin names are not usually employed in describing wildlife, and most users might prefer common names entered in the regular index of controlled terms. Family names need only be input if the paper treats a given family comprehensively. Posting-up to family names will not be undertaken.

Since some plant and animal species can be entered hundreds of times, a standard subdivision list will be required to allow manual browsing of a hardcopy or COM catalogue. A list of these subdivisions are already in use and can be made available for comment.

F. Geographic delimiters. In standard library word lists, geographic delimiters are treated as subdivisions of a subject, e.g. "Botany - Arizona". This is currently the practice with the WESTFORNET database. Machine searching will allow geographic information to be entered into separate fields; thereby, searches can be limited to certain localities. This is particularly important in forestry where climatic and political differences have implications for relevancy in a search. A question which will have to be answered is if a geographic delimiter field is used, should geographic subdivisions be dropped from the current word list or will they still be needed for manual browsing?



Posting-up will have to occur here--at least to the State level. National Forest names should be used instead of counties. Large physiographic regions will have to be included. Liaison with WO Geometronics will be maintained to follow developments on their hierarchical place names list.

PLEASE NOTE: The above five subject retrieval fields represent an attempt to satisfy the need of manual and machine retrieval. Designing subject retrieval methods to do both creates some duplicate work, e.g. subdivision of plant names may contain concepts which are separately entered in the controlled vocabulary field. Take the case of "Pinus ponderosa--Seed collection" in the species manual index and "Seed collection" in the controlled list. The rules would ask us to enter it both ways, yet for machine retrieval it need only be entered once. Is there a solution to this problem, or will we have to live with and pay the costs of this duplication?

III. THE PROPOSED FIELD LABELS:

These are to be regarded as elements in a bibliographic citation which can be machine manipulated. The contents of each field are designed to meet the objectives stated in the introduction. Regard them merely as a candidate list to provide an outline of the minimum amount of information put into a citation. Some of them may be redefined to meet the requirements of the software, but the contents will not change.

A. Essential indicators:

ACCESSION NUMBER: This is a unique number assigned to each record which indicates its place on a monthly alert. Its form is a two-character symbol WF followed by the year, month, and ALERT item number. Typically it will look like: WF78-07-143. Since many libraries will be filing documents by this number, provisions have been made for a dummy set which will allow materials to be input directly into the database without having to list them. This should prove a very useful device to save cooperating libraries from cataloging non-book materials, such as photoduplications and multilithed reports, in their own systems.

CATEGORY CODE: This is a numeric code which will arrange citations by broad topics and expedite retrieval during a machine search. (See II, D above). A sample scheme is given below:

4 FOREST MENSURATION AND MANAGEMENT

- | | |
|------|--|
| 4.0 | General |
| 4.1 | Systems and units of measurement, including conversion tables. Measuring instruments and apparatus |
| 4.2 | Measurements of trees, stands, and round timber |
| 4.21 | Volume tables |
| 4.22 | Merchantable volume |
| 4.3 | Growth, increment, and biological productivity (biomass) |
| 4.31 | Yield tables and forecasting production. Yield regulation |
| 4.4 | Management plans and planning |
| 4.5 | Inventory, including sampling methods |
| 4.6 | Surveying and mapping. Remote sensing |
| 4.7 | Business economics of forestry |
| 4.8 | Administration of forest enterprises |
| 4.9 | Miscellaneous |

FOREST SERVICE ORGANIZATIONAL UNIT: To be used to describe the unit responsible for the document. WO, R1, R2, R3, R4, R5, R6, R8, R9, R10, INT, NC, NE, PNW, PSW, RM, SE, SO, ITF, FPL, NA, and SA should be the minimum. WO could be expanded into divisions if need be. Multiple entries will be affixed when appropriate.

FOREST SERVICE RESEARCH WORK UNIT NUMBER: This unique project number allows retrieval on the documents of a given work unit. It can be assigned by editors submitting materials to WESTFORNET. It will allow managers to assess output of documents and retrieve such documents. Multiple copies of RWU's will be undertaken.

LOCATION OF ITEM. Currently the codes entered are:

WAU-FOR	University of Washington at Seattle, Forest Resources Library
UC-FOR	University of California at Berkeley, Forestry Library
PSW	WESTFORNET--BERKELEY
INT	WESTFORNET--OGDEN
RML	WESTFORNET--Fort Collins

PSW Station uses the database to produce annual inventories of books chargeable as property and on permanent loan to individuals. At the moment this information is entered into the same field as LOCA, but if other Stations elect to use the database in this fashion, a new field should be developed called:

PROPERTY MANAGEMENT: Here the location and person holding the copy could be entered, e.g. INT/Smith, J. L.

PERSONAL AUTHOR: No name authority work will be undertaken. Author's name will be inverted, followed by a comma, space, and initials. Since it is often useful to distinguish authors with common last names, the complete author statement can be transcribed after the title information. It is here that roles other than authorship can also be entered such as editor, compiler, etc. Using this practice should avoid sorting problems in the author indexes.

ADDED AUTHOR ENTRIES: Assuming that the concept of "main entry" will be preserved in the database (i.e. there will be a main entry "master"/tracings "slave" records), this field can be used to enter joint authors, editors, compilers, and the like. If the system's software does not allow automatic generation of records under added entries, this will have to be abandoned and information put into the "author" field above to produce a true author index.

ADDED CORPORATE ENTRIES: The name(s) of the organization(s) on the document as responsible for its intellectual content. Name authority for this field will use standard library verification tools. If a non-library preparing a file as a database subset and does not have access to an authority file, a second corporate author field for non-verified forms of the name might be considered.

CALL NUMBER: Library of Congress call number, vertical file notation, or other shelf indicator. It is essential that an on-line or printed up-to-date shelf list be available at all times. At the moment, only PSW library call numbers are input into this field. If the principle of central cataloging is ever accepted for all Forest Service documentation delivery centers, a re-definition of this field might be necessary.

TITLE: Title proper followed by parallel title and other titles, and statement of authorship according to AACR II, Chapter 6.

SERIES: Depending on selection of final software, this may be traced exactly as entered or will require an extra field for descriptions of series which are not traced or traced differently. Authority will be library rules of entry. However, if non-libraries are creating subsets of the database a field for unverified, untraced series names can be developed.

CONFERENCE TITLE: Used for name conferences followed by its number, place, and date. If required, these elements may be broken up into subfields. If a conference is unnamed, it can go into the title field above with appropriate indicators that it is a title of a conference.

SOURCE OF ANALYTIC: In most cases this will be the name of a journal followed by its volume, issue, and page numbers. Again this may be subfields and relators depending on the system chosen.

CITATION: A duplicate imprint and citation statement required by Forest Service editors to produce publication lists for their unit according to their own style rules.

DATE: Entered according to the AACR II for books and monographs and according to the Council of Biological Editors Style Manual for analytics of journal articles.

REPORT CODE: Report numbers coded as to issuing agency and year often found on Government issuances. The Forest Service has yet to develop one for its own publications. Having this in a separate field will aid in the design of printed output.

COLLATION: Used for illustration statement, pagination of non-analytics, accompanying materials, etc. Also, can be used to describe non-print media. Such as: 9 track, 800 BPI, or 35 min., col.

PUBLISHER: Enter according to AACR II. Leave blank for analytics. Use "Analytic" field instead.

PLACE OF PUBLICATION: (same as above)

NOTES: Use for all kinds: dissertations, bibliographic history, contents, etc.

ANNOTATIONS: Brief editor's annotations used for production of their publications lists. Normally a sentence or two.

DIGESTS: Lengthy summaries which should reduce the urgency to see the original materials. This is a Level III service such as provided by FIREBASE. Data descriptions could be included in the narrative of the digest, or, if necessary, standardized and put into a separate field called DATA.

CONTROLLED SUBJECT HEADINGS: These are index terms which are controlled and provide manual access to subjects to the database (see II, A above.)

IDENTIFIERS: Uncontrolled words allowing more specificity in retrieval, especially with regard to new jargon. Very useful when the controlled terms are not sufficient to adequately describe subject matter. In any on-line searching operations, this field would be ideally merged with the controlled subject

headings and words from titles, in the interests of efficient subject searching. The index words can be loaded here until the final plan is formulated to control the vocabulary.

GEOGRAPHICAL LOCATION: Arranged by physiographic regions only when appropriate. Otherwise, political subdivisions will suffice. For U.S. entries, locales should always be posted up to State names. NOTE: This type of input does not fit the MARC standards which are more general. A sample is noted below:

CALIFORNIA:COASTAL
CALIFORNIA:HUMBOLDT COUNTY
CALIFORNIA:MOJAVE DESERT
CALIFORNIA:SAN DIEGO COUNTY
CALIFORNIA:SANTA BARBARA COUNTY
CALIFORNIA:SIERRA NEVADA
CALIFORNIA:SOUTHERN

OVERVIEW: Used in the Forest Service accomplishments statement giving an overview of the publications content. This can be put at the head of DIGESTS to conform with AGRIS formats.

TAXONOMIC INFORMATION: Genus, species, and varieties names are entered here. These augment subject headings and identifiers. A list of standard subdivisions will be used to allow users ease when browsing for literature of interest.

B. Less essential indicators: Cataloging information which is less user-oriented and which may not be worth a separate field or the time to input except to satisfy non-WESTFORNET defined functions.

CONTRACTED WORK: Used to identify contracted work between the Forest Service and outside organizations performing extramural work.

LANGUAGE: Currently the database does not deal in foreign literature. It relies on larger systems for this kind of control. Limiting searches to language is not an issue except as required by other systems.

STANDARD NUMBER: ISBN, ISSN, etc.

SUBSET FILE: The name or acronym for the subset of the database. This will be used later if the Forest Service merges a number of its files together. It will allow the separation of each of these into searchable subsets.

C. MARC and AGRIS fields: The fields mentioned above are in most cases coincident to fields in MARC and AGRIS. However, a lack of exact correspondence will not hamper conversions into these two systems as long as there is consistency in the cataloging effort. Fields which serve no immediate WESTFORNET database needs can be systems supplied.

D. NTIS fields: NTIS is considering dropping its input charges. At this time no direct NTIS tape submissions are planned.



SUMMARY OF BIBLIOGRAPHIC LABELS

On the table, following, you will find a list of the proposed field labels and their use according to application. As details about their application become known, the list may be expanded accordingly. However, we believe the essentials are indicated.

	WESTFORNET USE	EDITORIAL SHOP PUBL. LIST	RESEARCH ACCOMPLISHMENTS	PROPERTY INVENTORIES	ADMINISTRATIVE REVIEWS	OTHER FOREST SERVICE DATA- BASES	
ACCESSION NUMBER	X						
ADDED ENTRIES	X						
ANALYTIC SOURCE	X	X	X	X	X	X	
ANNOTATIONS		X					
AUTHOR (PERSONAL)	X	X	X	X	X	X	
AUTHOR (CORPORATE)	X	X	X	X	X	X	
CALL NUMBER	X						
CATEGORY CODE	X	X				X	
CITATION		X	X	X	X	X	
COLLATION	X	X	X	X	X	X	
CONTRACTED WORK	X				X		
CONTROLLED INDEX TERMS	X	X				X	
DATE	X	X	X	X	X	X	
DIGESTS						X	
FOREST SERVICE ORGANIZA- TIONAL UNIT		X	X		X		
FOREST SERVICE RESEARCH WORK UNIT		X	X		X		
GEOGRAPHIC LOCATION	X					X	
IDENTIFIERS	X					X	
LANGUAGE	X					X	
LOCATION	X			X			
NOTES	X	X	X	X	X	X	
OVERVIEW			X				
PLACE	X	X	X	X	X	X	
PROPERTY MANAGEMENT				X			
PUBLISHER	X	X	X	X	X	X	
REPORT CODE	X	X	X	X	X	X	
SERIES	X	X	X	X	X	X	
STANDARD NUMBER	X						
SUBSET FILE	X	X	X		X	X	
TAXONOMIC INFORMATION	X	X				X	
TITLE (MONOGRAPH)	X	X	X	X	X	X	
TITLE (CONFERENCE)	X	X	X	X	X	X	

APPENDIX IX

Selective Dissemination of Information--SDI Services

The purpose of the *Monthly Alert* is to announce literature of general interest. It can not meet all the information needs of every person who is served by WESTFORNET. In fact, given the multi- and interdisciplinary nature of forestry practice and research, no single retrieval or announcement service can cover the great diffusion of subjects which are of interest to the entire user group.

Fortunately cost-effective technologies exist which can provide each user with an individualized, supplementary alerting service. Marketed as Selective Dissemination of Information (SDI) services, these are capable of producing customized bibliographies on a continuing basis. A profile of key words, describing the particular interests of the user, is entered into a computer system. Updates of selected data bases are compared against the profile. Citations which satisfy the search strategy are printed and mailed regularly to each user. The result is a convenient and inexpensive list of research materials on a given subject.

Performance and costs of SDI systems vary greatly. They also are part of a rapidly emerging information-handling technology as is evidenced by the development of highly sophisticated search languages, reduction in costs, and the proliferation of these services in recent years. Because of competition among suppliers, the Forest Service should avoid long term group contracts and any restrictive regulations that might inhibit getting the best return from investments. Cost alone, however, should not be the sole determinant when selecting a system. Users will best be served if search analysts have the freedom to pick the system which is not only the most economical but which also performs well against other selection criteria. Following is a discussion of these criteria and the candidate systems.

COSTS OF CANDIDATE SYSTEMS

In 1978 only four systems are practicable in terms of costs and accessibility. In order of expense per profile they are:

<u>System</u>	<u>Monthly Cost per Database Searched</u>	<u>Charge per Printed Citation</u>
BIBLIOGRAPHIC RETRIEVAL SERVICE, Scotia, N.Y.	\$3.00	\$0.15/page or about \$0.01/citation
CURRENT AWARENESS LITERATURE SERVICE, SEA/TIS, Beltsville, Md. (Limited to employees of USDA and certain cooperators)	\$5.00	No charges
COMPUTERIZED INFORMATION SERVICE, UCLA, Los Angeles	\$7.00 to \$8.00**	
LOCKHEED/DIALOG, Palo Alto, California	\$6.00 to \$9.00	First 25 no charge. Then from \$0.05 to .15 depending on database

**Estimated on a yearly basis and depending upon citations printed



CRITERIA for EVALUATING SYSTEMS

As suggested already, user satisfaction is best served through use of several systems rather than any single service. Experienced search analysts can and should be trusted to determine which system and database to use for a given search. When evaluating SDI systems, long lists of user requirements can be generated; however, in the literature six broad categories are usually recognized: 1. coverage; 2. Recall; 3. Precision; 4. Response times; 5. User effort; 6. Printing options.

COVERAGE: Considered here are the numbers of data bases and years covered. However, comprehensiveness of coverage is not always equal to suitability. Although five data bases may be available covering a subject, only one may be constructed and indexed with a slant adequate to pull out the literature relevant to a given question.

RECALL: This is the ratio of the number of relevant documents retrieved to the number of documents contained within the system. This quantitative measure means very little unless compared to its companion measure, precision.

PRECISION: This is the ratio of relevant documents retrieved to the total number of documents retrieved. The ratio measures the efficiency of a particular system.

Recall and precision are inversely related. The higher the recall ratio, the lower the precision. This is less paradoxical when you consider that a direct search of a few keywords in titles such as "silviculture" and "pines" will yield a very highly precise search on silviculture of pine trees. However, silviculture, a generic concept, may include many citations of interest to the user but which do not have the word "silviculture" in the title. These titles may only contain concepts like "site preparation", "seeding", "fertilization", "stand improvement" etc. By adding these key words to the search profile, recall will be enhanced considerably. Recall may increase 300% above the original number of items retrieved when "silviculture" alone was used. The more terms supplied, the higher the recall.

Relevancy begins to decrease, however, as terms are introduced which have more than one meaning or which have only peripheral interest to the question. In the instance of silviculture of pines, the term seed production of pines could have two meanings: 1. related to the conditions of the stand or 2. related to the output of seed orchards. In the latter case, a "false drop", or unwanted citation, would surely occur, and precision would suffer.

So far we have only dealt with a title search. A sophisticated search system allows retrieval on other elements in a citation. Searches can be performed on corporate personal names, on works in abstracts, or on controlled index works only. As soon as you introduce these more complicating factors, user satisfaction on a given search becomes a direct function of a system's ability to manipulate all of these bibliographic elements either separately or in concert with one another. Whether these manipulations are desirable or not should be left to search analysts who are familiar with the contents of the files, the indexing policies of the data base supplier, the subtleties of the search language, etc. This important point will be discussed later when particular searches are related to the candidate systems.

RESPONSE TIME: This is the time to get a search to the user. It is a secondary



consideration to recall and precision because all systems being considered are comparable. We are taking the position that a few weeks more or less should not affect the choice of a candidate system. However, the ability of an SDI service to receive tapes from a database supplier and to run stored profiles promptly against the update should be monitored for gross variations. Appropriate corrective measures should be taken.

USER EFFORT: Simply stated, this is the effort expended by the user and the analyst to make the service work for them. Considered here are ease of assimilating the documentation, ease of revising profiles, ability to test the profile against the retrospective file *before* formal submission, purchase orders, the submission forms themselves, etc.

PRINTING OPTIONS: Readability of search results and ability of the system to suppress information other than citations should be considered. For example, in a search of AGRICOLA it would be useful to suppress the category code numbers. They just clutter up a citation. However, printing of NAL's call numbers is useful for subsequent document delivery. Also to be considered is whether results go directly to users or whether they have to be processed at a central point. Considerable clerical processing could be saved if a chosen system automatically generates direct mailings.

CRITIQUE OF SYSTEMS

I. COMPUTERIZED INFORMATION SERVICE (CIS):

Expense and cumbersome systems design eliminates CIS as a usable system for WESTFORNET. However, CIS can be used through S&PF to provide this service to the private sector. At the time of this writing, CIS is negotiating with the California State Library to make it available through CLASS (California Library Authority for Systems and Services). This would allow S&PF to offer the service to companies without formal libraries. The Forest Service could provide the services of a search analyst and a sample purchase order while at the same time avoiding the fiscal problems of charging for the service. This is the only recommendation for the use of this system.

II. LOCKHEED/DIALOG:

Again, expense rules DIALOG out for most searches. However, DIALOG does have exclusives on many databases, e.g., *METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS*. DIALOG also has certain searching features which make it useful. Recommendations at this time are:

(1). Store search profiles in the system on databases not held by any other vendor. The cost of doing this is only \$0.25/month. Since DIALOG does not provide automatic SDI for the less popular databases, the search center will have to allot time to process them, perhaps on a bi-monthly basis, using the update codes to the files. This will only be necessary, hopefully, in a very few cases, as it does require staff time. However, if performed only bi-monthly, this will be offset by savings in computer charges. Moreover, this is such a simple keying-in operation, clerks can be easily trained to run them.

(2). Use DIALOG when high recall and precision are impossible with cheaper systems. This will particularly be necessary when searching a concept in CAB ABSTRACTS is necessary. Something impossible with any other system.



COMMENTS: Response time is delayed with DIALOG because no mechanism exists to mail the results directly to the user. There is not total flexibility in designing print options, although this is a very minor point given the fact that the citations are very readable. Recall and precision are excellent, and comparable with any other system. Coverage of databases is the best of all with 65 to search.

III. CURRENT AWARENESS LITERATURE SERVICE (CALS):

A usable system operated within the Department by SEA-TIS; however, cost at the moment is 40% more than the cheapest system offered by the private sector. This is changing and new charges may be forthcoming which may make CALS more attractive. At the time of this writing CALS should be used for least expensive searches of:

(1). CAB, not requiring searches of abstracts. CAB/CALS is about half as expensive as CAB/DIALOG. Despite the minor difficulty of not being able to search abstracts, virtually all of the potential CAB searches could be entrusted to this system.

(2). ENGINEERING INDEX.

COMMENTS: Coverage is more limited with CALS. It does not have many potentially useful databases, but the major ones are certainly there. Recall and precision are adequate, and mailings of search results can, upon request, go directly to users. Because it is in the Department, payment is easy. However, it is a batch system, and immediate checking on-line of a profile's relevancy is impossible to do. Also, because the profiles are submitted on forms, more paper is handled than with on-line systems.

IV. BIBLIOGRAPHIC RETRIEVAL SERVICE (BRS):

In terms of efficiency and costs of search language, BRS should be the primary system used for SDI services. It allows identity of the user to be imprinted in the covering pages in enough detail to permit transmission in the blanket or office mails. It has three levels of nested logic. One exclusive feature, post paragraph qualification, provides for numbers to be restricted without having to reenter the entire statement. Profiles can be edited instantly, on-line, permitting easy revision. Print options can be designed by the user, but simplified default options are also stored in the system. BRS should be used for AGRICOLA, NTIS, BIOSIS, and DISSERTATION ABSTRACTS searches. This will be about 70% of the total business.

COMMENTS: The BRS search language combines some of the best features in the market today. Multi-term truncated entries can be qualified to given fields in three levels of nested logic. This makes it possible to manipulate citations in every conceivable way. It is currently the cheapest system to use, by far, with the promise of even further reductions in price when the Federal Library Committee renegotiates its group contract in the near future.

A multi-system configuration of SDI services is recommended. Earmarking of overhead monies to provide basic services to all users would be the easiest form of fiscal accounting. However, if projects and forests are going to be billed separately, a careful accounting system will have to be designed.

APPENDIX X

The Concept of "WESTFORNET Central"

It is very important to avoid the mistake of confounding the WESTFORNET database with the totality of WESTFORNET itself. WESTFORNET is a special library-based forestry information network. It provides a variety of services besides those based on the WESTFORNET database.

The Forest Service regions and stations supporting WESTFORNET incur two kinds of expenses. By far the larger part of their WESTFORNET budgets go to support local service centers. These are located in Forest Service field libraries and in contracting land-grant colleges. Staffing and managing the service centers are responsibilities of the supporting Forest Service units. A small part (less than 10 percent) of their WESTFORNET budgets supports a central service producing the WESTFORNET database, monthly alerts, union catalogs of holdings, training materials, and consultative services.

The need for a "WESTFORNET Central" began to evolve with CALFORNET, at which time Region 5 was asked to help defray PSW's costs to prepare the *Monthly Alert*. The need became more distinct with PACFORNET. Then PNW and Region 6 began to reimburse PSW for database maintenance and *Monthly Alert* production. A more rigorous assessment of costs was necessary with the advent of WESTFORNET. A memo on the "Central management services and database for WESTFORNET" was sent to all the participating units of WESTFORNET. This memo laid a groundwork for sharing the costs of WESTFORNET Central as a common but distinct unit jointly maintained by all. (See memo at end of appendix.)

The WESTFORNET Central concept is a model for a potential central unit of a horizontally structured national forestry information network. The SOUTHFORNET Committee has sent representatives to study WESTFORNET. There was concurrence that SOUTHFORNET's projected *Monthly Alert* and union library catalog could most effectively be constructed and maintained through cooperation with WESTFORNET. The concept of a centrally maintained, but cooperatively and regionally constructed, database offers the greatest returns to all participants. It is important to look at the WESTFORNET Central unit in terms of its role and responsibilities. From this can be projected those of a central unit for an eventual national system.

WESTFORNET Central's

Roles and responsibilities

Management and manipulation of WESTFORNET database

Monthly Alert Production

Produce camera ready copy in four regional editions

Union catalog management

Cooperative acquisitions

Descriptive cataloging



Subject indexing

Cumulate Alerts and other catalog records
into union catalog

Edit and correct database

Produce and distribute COM editions of
union catalog to all participating libraries
and to other cooperating libraries

Produce special bibliographies and other
subsets from database

Technical support for Service Centers

Support and participate in making and
managing contracts for library services

Assist in recruiting as necessary

Train librarians and information specialists
to provide WESTFORNET services

Monitor services and standards to assure quality
of service to users in all WESTFORNET regions

Management, funding, location and accountability

WESTFORNET Central is at the PSW Station, Berkeley, because this is the historical site of the evolution from CALFORNET. Availability of computer services and the immense library resources in the area have been important factors in the operational success of WESTFORNET Central. Funding is based, as discussed above and in the attached memo, on the use of PSW Station employees to perform managerial and technical functions. WESTFORNET Central is therefore administrated by PSW.

The present arrangements should be formally reviewed by the Regions and Stations funding WESTFORNET in terms of organizational assignments, location, and staffing. Some of these options are discussed in the Study Team Report section 6. *Managerial Conclusions*. Definitive estimates of staffing and funding can really be made only after determination of the processing system to be used for the WESTFORNET database. The chosen system and mode of operation have a direct effect on the number and kinds of staff needed at WESTFORNET Central. It is also important in consideration of location of the unit.

If and when a national forestry information network comes into being, questions about the assignment, funding, staffing, location and management of its central unit would have to be again considered in view of the larger scale of operation.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

PSW

REPLY TO: 1670 Library

March 2, 1978

SUBJECT: Central management services and database for WESTFORNET



TO: Current members of PACFORNET and future members
of WESTFORNET

Following a recommendation of the ad hoc PACFORNET management team, PSW has analyzed costs for providing central management services and the database for WESTFORNET, based on costs for current operation of PACFORNET. The purpose of this letter is to explain the operation and the rationale for allocation of the costs to participants.

At my request, Bruce Yerke prepared the enclosed issue paper on centralized cost and funding for WESTFORNET and its database. We estimate Yerke would be involved full time, a database manager GS-11 at half time, a library technician at GS-7 half time, a computer specialist GS-6 at half time, plus \$5,000 for computer expenses and about \$7,000 for travel, materials, etc. This brings the estimated total cost for the centralized operation to \$76,000 per year. Currently this cost is being covered by \$9,000 from R-6/PNW and \$67,000 contributed by PSW. This situation shows why redistribution of the funding of these central services costs is immediately in order.

Our issue paper laid out four alternatives for financing. We are still negotiating for financing from the WO (Alternative 4). Realistically, we expect that costs will have to be shared by all units participating in WESTFORNET (Alternative 2). Therefore, we have examined this alternative in greater detail.

How might these costs be distributed to the current members of PACFORNET and the future members of WESTFORNET? We first considered the potential numbers of users as estimated in Table 7 of the "Evaluation of PACFORNET." These are:

<u>Region</u>	<u>Potential Users</u>	<u>Station</u>	<u>Potential Users</u>
1	950	INT	138
4	842		
2	692	RM	112
3	542		
5	1,560	PSW	136
6	1,396	PNW	159
10	268		



Knowing that scientists at Stations have a different kind and amount of use than practitioners at the Regions, we were unable to use the numbers of potential users directly in prorating the base costs. Instead, we went to estimated current costs for actually providing services to PACFORNET and WESTFORNET-Intermountain. Region 6 and PNW are splitting total costs for PACFORNET-North, estimated at \$140,000. They contributed \$9,000 to PSW for support of central services, leaving \$131,000 for services from PACFORNET-North. R-5 is contributing about \$59,000 for services to its users; PSW estimates about \$50,000 for services to users; this gives a total of \$109,000 for services from PACFORNET-South. The estimated full year costs for WESTFORNET-Intermountain is \$118,000--to be provided by Regions 1, 4 and Intermountain. We guesstimated that about \$100,000 would be budgeted by Regions 2, 3 and Rockymountain for WESTFORNET-Rocky Mountain.

Assuming that the \$76,000 of centralized costs should be distributed to each in proportion to costs for direct services, we calculated fair shares. (From a calculation that will be explained in a later paragraph, we estimated that Region 5 and PSW should provide an additional \$22,000 worth of service which makes their total \$131,000, just as for Regions 6, 10 and PNW.) The prorata distribution then of the total service cost of \$480,000 to the \$76,000 of WESTFORNET's central services works out as follows:

Units	Estimated Direct Service Costs	Share of Central Services
R 6, 10/PNW	\$131,000	\$20,500
R 5/PSW	131,000	20,500
R 1, 4/INT	118,000	19,000
R 2, 3/RM	100,000	16,000
	<u>\$480,000</u>	<u>\$76,000</u>

If the above shares are acceptable, then R-6/PNW plus R-10 should arrange to provide \$11,500 more than the \$9,000 already provided for central services. R-5 should arrange to provide \$11,500 for its share of central services. Participants in WESTFORNET-Intermountain and WESTFORNET-Rocky Mountain should arrange to transfer, in FY 1979, the indicated sums of \$19,000 and \$16,000 respectively.

Considering that WESTFORNET-Intermountain and WESTFORNET-Rocky Mountain will start operation May 8, 1978 we estimate that five-twelfths or 42 percent of these costs should be paid in FY 1978. Therefore, we would appreciate receiving \$8,000 from WESTFORNET-Intermountain and \$7,000 from WESTFORNET-Rocky Mountain as reimbursement in FY 1978.

Earlier in this letter we noted that PSW has been carrying a cost of about \$67,000 in FY 77 and FY 78 for these centralized services. The only other support is \$9,000 provided by R 6/PNW. Assuming that PSW



will receive the requested transfers for FY 78 from R-5 and from R-6/PNW, we would reprogram \$22,000 to augment services in PACFORNET-South. This would help meet the snowballing number of requests and resultant increased costs. This is necessary considering the greatly increased service load that has occurred within the last few months and we are expecting the load to accelerate as training materials for WESTFORNET become available and are put to use in R-5. This means that PSW would provide \$72,000 (55 percent) for services compared to \$59,000 (45 percent) from R-5 for a total of \$131,000 in FY 1978. Meanwhile the R-5 proportion of services delivered so far this Fiscal Year amounts to about 57 percent, with 43 percent going to PSW personnel. If R-5 accepts, their proportional share is to be 57 percent, as is evidenced by the level of current services being delivered. R-5's share (57 percent) of \$131,000 would be \$75,000. Assuming that R-5 wants to pay its fair share, we would appreciate receiving \$16,000 in addition to the \$59,000 already provided.

The above analysis is based on current costs estimated at \$76,000 for the system's present level of operation. We know that this system is inadequate and will have to be upgraded substantially in order to carry the full WESTFORNET and ultimately a national database. In other words, be forewarned that central costs probably will increase during the next year or two depending upon the outcome of a study about to be proposed.

On March 14 Yerke and I will present a proposal (first draft enclosed) to the Systems Coordinating Council. We hope they will approve and join with us in a study of the WESTFORNET/NATFORNET database situation. Certainly this analysis will require some financial support for consultants and travel. We will plan to use funds requested as reimbursements for central services to help defray these costs. Of course, we also expect the Washington Office to contribute something to these costs. The study should be completed by the start of the fourth quarter of FY 1978. Only then will we have better ways of estimating the costs for providing the centralized services in FY 1979 and beyond.

If you have any questions or need additional information please call.


R. Z. CALLAHAM
Director

Enclosure

Addressees: Regions 1 through 6, 10, and Western Stations

cc: Calvert
Yerke

APPENDIX XI

Minimum and Optimum Database System Requirements for WESTFORNET

EVALUATION CRITERIA		
	MANDATORY	DESIRABLE
<hr/>		
Catalog		
Input to database	On-line entry of citations.	Interactive querying & error checking features
Modification of database	Ability to easily modify citations for either correction or routine changes.	
File content	System rules allow the use of sufficient local entries into citations (see Appendix VIII)	
File structure and characteristics	Capability to extract sets of accessions by dates of entry. Must allow tapes of our material to be brought out for any period we need: monthly, semi-annually, etc.	
	Local cataloging information must be available for output to accession tapes.	Local cataloging information should be available for on-line display.
	Local cataloging information must remain in the system for all citations which have been extracted as accessions.	
Access to files	Other WESTFORNET libraries must be able to use the primary catalog in a search mode.	Other WESTFORNET nodes should be able to make cataloging entries.
Resource Community	WESTFORNET must have access to the files of other system users, particularly large university research libraries.	Access to the same system used by the UC library would be the most advantageous.



Products:

Scheduled products:

Monthly Alert output in the necessary form for the four WESTFORNET areas and with subject and species indexes, produced in upper and lower case and with good quality typesetting.

Production of a monthly accessions list as a with-in system product of a form and quality which would suffice for the *Monthly Alert*.

Special products :

Book catalogs--author, title, series, shelf list, location--on microform. Tapes of catalog or accessions for NAL and possibly NTIS.

Production of these within.

Editorial author's lists :

Produce special bibliographies, etc.

Special products, such as subset lists of accessions by Stations, by editorial units, etc.

Retrieval: Access by others

File must be accessible to University, other levels of government, and private sector users and co-operators for searching.

Primary file should be on a system which offers ease of access and sufficient search power to avoid a second location of database.

Search capability:

Must be able to search author, title and subject fields with Boolean operators.

. Service relations:

A. Stability of system

Should have signs of permanence--should have many, and large, established users and show good likelihood of continuing operation.

B. Contractual arrangements

Should be as simple as possible with separate billing available for separate sub-users.

C. System performance--capacity, accessibility, response time, down time.

Most systems advertise their own goals for these items. The best measurement might be some survey of a few users, or one large one, to determine whether or not they adhere to their own standards.

Management should express an attitude of seeking new business, but again, this attitude should be backed by



MANDATORY

DESIRABLE

user satisfaction that the managers have a record of keeping system capacity ahead of user demand.

. Telecommunications

Access to network on a dedicated line.

Arrangement by which the system managers, as part of the contract, accept responsibility for service up to the terminal.

. Delivery of output products: Turnaround and service relations

The output products which are available and offered on the basis of some stated, or agreed upon, delivery schedule, are probably products used by others on the system and the quality of service can be determined by a measure of user satisfaction.



APPENDIX XII

Study Team core members, observers, and other cooperators

STUDY TEAM:

Vincent P. Aitro, Supervisory Librarian, WESTFORNET--Berkeley
Hilary D. Burton, Systems Specialist, SEA-TIS-CALS
James W. Clarke, Systems Specialist, PSW
Robert H. Hamre, Information Office (RM), representing the WO
editorial offices
Theodor B. Yerke, WESTFORNET Coordinator, PSW

COOPERATORS:

Verne van Dyke, SEA-TIS-NAL
Barbara Gordon, Forestry Librarian, U. Washington, representing ASCUFRO
Linda White, U. Arizona, representing ASCUFRO

OBSERVERS:

Frances Barney, Librarian, WESTFORNET--Ft. Collins
L. David Dwinell, Forestry Sciences Laboratory, Athens, GA, representing
the SOUTHFORNET Committee
George H. Goodwin, Chief Librarian, U.S. Geological Survey Library,
Reston, VA
Harry E. Hodgdon, Field Director, The Wildlife Society, Washington, D.C.
Raymond A. Jensen, Office of Water Research and Technology, USDI
Richard L. Knox, S&PF, WO, representing the SCC
Harold G. Marx, Research, WO, representing the SCC
Helen McCuaig, Fisheries and Environment Canada
Mary Lou Melley, Environmental Protection Agency
Gary R. Nordstrom, Staff Forester, Soil Conservation Service
Boyd Post, Office of the Deputy Director for Cooperative Research
Norman J. Scott, Jr., U.S. Fish and Wildlife Service
Susan Smith, Heritage Conservation and Recreation Service

FOREST SERVICE: a representative from each of the following:

Computer Systems Application Staff
Computer Technology Staff
Data Management Staff



APPENDIX XIII

auto-graphics, inc.

July 31, 1978

Mr. Jim Clark
United States Forest Service
Post Office Box 245
Berkeley, California 94701

Dear Mr. Clark:

Thank you for taking time out of your busy schedule to visit our plant and discuss your catalog and monthly Alert projects. This letter will serve to summarize the various costs we discussed.

From our discussion we understand that you plan to freeze your present catalog in its present format and begin new when you start cataloging with BALLOTS. Presently you expect to cumulate your new holdings, acquired at the rate of 300 - 500 per month, for six months and then produce a fiche catalog. In the meantime, certain of the new titles will be published in the monthly Alert. The monthly Alert contains an index and a main entry section. The main entry section is divided into subject sections with the main entries sorted alphabetically within each subject area. We understand the Alert is produced monthly for four geographic sections of the West.

As was discussed, some of the processing steps to produce your catalog and the monthly Alert will require some initial programming. We estimate the cost of programming will be \$1,200.00. The other production costs are itemized below:

Masterfile Maintenance

Update masterfile from BALLOTS tapes - \$100.00 per update plus \$0.10 per record.

Catalog Production

\$250.00 base cost per catalog issue plus \$0.25 per frame.
Fiche copies \$0.35 each.

Monthly Alert

\$250.00 base cost per issue plus \$15.00 per page for camera ready copy.



auto-graphics, inc.

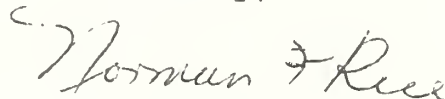
Mr. Jim Clark
United States Forest Service
July 31, 1978
Page two

The catalog production cost includes all data manipulation. As was discussed, this will also include the production of a shelf list in fiche. The additional cost of the shelf list is covered by reason of the fact there will necessarily be more frames produced when producing a shelf list.

Concerning the monthly Alert, the one basic charge of \$250.00 covers all four geographic locations provided they are produced in one production run. The output will be done by photo-composition with variable spaced fonts so that the quality will be much superior to what you now have. In addition, we believe there will be a 25 to 30% space saving which will significantly reduce your printing costs. The above figures do not include the typesetting of the cover or the front matter.

We appreciate this opportunity to quote on your project. If we can help with further information, please let me know.

Sincerely,



Norman F. Rice
Marketing Representative

NFR:mlb
cc: Parke Lightbown



APPENDIX XIV

Desirable Characteristics of Interactive Literature Search Services

Retrospective searching of the WESTFORNET database will be required in order to prepare bibliographies, to assess production of documents by Forest Service units, to assist in answering inquiries, etc. Therefore, quick response time and accurate searching of the files must be possible. If other Forest Service bibliographic efforts are compatible with the WESTFORNET database then files can be merged and searched simultaneously. How to make WESTFORNET available for searching must be decided.

Only three commercial search services are practicable in terms of efficiency and accessibility: (1) LOCKHEED/DIALOG; (2) SDC/ORBIT; (3) BIBLIOGRAPHIC RETRIEVAL SERVICE (BRS). One government service, DOE/RECON, for reasons given later is not satisfactory. Search languages of the three commercial services are comparable in terms of precision and recall. They are all competitive in terms of response time, user effort, readability of the printouts, etc.

If the WESTFORNET database becomes a subset of AGRICOLA, then it will automatically be available as a public file on all three services. For this to occur, an agreement of shared cataloging will have to be made with SEA/TIS and a conversion program written, if needed. If WESTFORNET does not affiliate with AGRICOLA, then the database could be placed either as a public or private file with one or more services.

At the time of this writing, BRS is the least expensive service to load and maintain. However, BRS requires special group contracts and/or minimum use guarantees. As a result, many potential users of the database may be denied access. The Forest Service might give the password to use its private file to selected cooperators, librarians at landgrant universities, and others in the information community, so people outside of the Forest Service would use the file directly. Not every one in this user group has access to BRS, but most every one has search capabilities with ORBIT and DIALOG. Before any service could be chosen, quotations of costs and service constraints would have to be obtained from the three services and carefully compared.

SOME FEATURES OF FOUR SERVICES

1. BIBLIOGRAPHIC RETRIEVAL SERVICES (BRS), Scotia, New York:

BRS has developed the most sophisticated search language of any of the systems. Based on IBM's STAIRS, it allows multiple word entries in a single search statement with or without truncation. The BRS search language incorporates some of the best features of its two competitors. However, its utility is greatly diminished because many files have only small portions on-line. This requires searching the off-line portions in the evenings. From a reference or retrieval viewpoint, the coverage in BRS is the least comprehensive of any of the other services. It has the least number of public files and holds almost no "exclusives" on any database.

2. LOCKHEED/DIALOG, LOCKHEED INFORMATION SERVICES, Palo Alto, California:

LOCKHEED/DIALOG: DIALOG has the most coverage of any of the services with approximately 65 databases. It has exclusive contracts for files of the



Commonwealth Agriculture Bureau (including *Forestry Abstracts*) and CRIS. Any reference center should subscribe first to this service because of its efficiency and variety of files. DIALOG has developed a number of unique features which, although not essential to a good search, do enhance its use. Most notable among these are the ability to store profiles and run them at will against any desired database. This is most useful when recalling frequently searched concepts. Also unique to DIALOG is on-line accounting which permits instant costing of search results, a very useful feature if projects or forests are to be billed for the service.

3. SYSTEM DEVELOPMENT CORPORATIONS ORBIT, Santa Monica, California:

One of ORBIT's most desirable features is its ability to mail searches directly to users from its off-line printers, thereby saving a few days time in delivery output. Another feature is that it can string-search virtually every character in a citation once a gross subset is created in a search. Although string searching can take a few extra minutes in computer time, it does allow a searcher to examine fields that are otherwise unsearchable by any other service. ORBIT also allows multiple lines of entry of terms using truncation in a single search statement. This saves a lot of response time when inputting long profiles of many search words. As for coverage, ORBIT duplicates many of the LOCKHEED/DIALOG files. However, it holds an exclusive on the Institute of Paper Chemistry's PAPERCHEM file, and the Forest Products Research Society is about to give them AIDS.

4. DEPT. OF ENERGY's RECON, Oak Ridge, Tennessee:

This is the least sophisticated service by far. It should not be seriously considered for these reasons:

- a. RECON's telecommunications are the least reliable. Busy signals are encountered during peak hours, and the system is down so often as to be noticeable.
- b. Response time between commands is decidedly slower than one expects from the commercial services.
- c. The system is incapable of searching title words in the first gross subset. This results in very dirty searches with low precision and recall.
- d. The mail from Oak Ridge takes days longer to be delivered than from the three other services.
- e. They hold exclusives on only one other database of value to the Forest Service. This is WRSIC, the contents of *Selected Water Resources Abstracts*.
- f. At the time of this writing, RECON is considering putting all of its databases into the commercial sector. If this occurs, there would probably be no reason for the Forest Service libraries to continue to maintain a RECON account.

2p A14-3 thru 19 provide
details on costs, services
and operations of these
& services. (Avail. in
original doc. or from PSA)

DESIRABLE CHARACTERISTICS OF AN INTERACTIVE LITERATURE

SEARCH SYSTEM FOR FOREST SERVICE FILES

		SEARCH SYSTEM			
		ERDA	LOCKHEED	SDC	
		RECON	DIALOG	ORBIT	BRS
<hr/>					
A. <u>LOADING & FILE MAINTENANCE</u>					
<hr/>					
1.	System is receptive to loading and servicing citation data bases of various sizes and building rates.				
(a)	Small sized slowly building data base (e.g. PLANBASE)	yes	yes	yes	yes
(i)	600 citations with, and 2,500 citations without digests, (6.07x10 ⁶ characters)				
(ii)	adding ca. 100 and 1400 in each respective category per year (1.7x10 ⁶ characters)	yes	yes	yes	yes
(iii)	Ultimately file size costs 3,000 with digests, 10,000 without (28.6x10 ⁶ characters)	yes	yes	yes	yes
<hr/>					
(b)	Medium sized				
(i)	4000 citations with digests and adding 1300 per year. (10x10 ⁶ characters + 3.25 x10 ⁶ annually) (e.g. FIREBASE)	yes	yes	yes	yes
(ii)	17,000 citations without digests and adding 2600 per year. (8.7x10 ⁶ characters x 33x10 ⁶ annually) (e.g. WESTFORNET)	yes	yes	yes	yes
(c)	System has sufficient staffing to readily provide maintenance services to such files.	no	yes	yes	yes
<hr/>					
2.	System should permit direct work on files by builder				
(a)	Permits direct, on-line editing, correction and deletion of records on files	no	no	no	no
(b)	Permits direct, on-line loading of new records into file	no	no	no	yes



SEARCH SYSTEM			
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

3. System should be able to accommodate lengthy individual records			
(a) maximum record length (in characters)	12,000 *	32,756 *	32,000 *
(b) maximum record length which can be displayed on-line	12,000 *	12,000 *	32,000 *
4. Little or no alteration of record fields or control symbols should be needed to make them compatible with system requirements for loading and operation			
(a) Number of changes which must be made on record formats before they are shipped to system for loading	** 0		*** 0
(b) Approximate costs of conversion if done by FS personnel			
(c) Approximate costs of conversion if done by search system personnel	0	\$200/ change	0
(d) Individual files can be loaded into one merged file, yet still be easily separated into 2 or more main subdivisions for online search sessions (e.g. a group of citations with digest & a group without)	yes	yes	
5. Contractual or administrative approvals should be simple and quickly obtainable for getting file loaded on system, making changes in records, adding records, requesting special services, etc.			
(a) Number of individuals who must be contacted for approval of actions			
(b) Typical lag time before obtaining action			
6. System loading and maintenance costs should be relatively inexpensive			
(a) Initial file loading charge	0	\$2,000/ 30,000 records	\$2,000/ 25,000 records with \$1,000 min.

* Actual record length limitations are less than the shown amounts by about 250-350, because the system's search and print programming controls require use of some character capacity for their ability to manipulate records and record fields.

** Files which have been assembled for/on ERDA ORLOOK system (as most RRTIS files have) can be directly loaded on RECON without any alteration.

*** All work on adjusting record formats is included in the system loading charge.



	SEARCH SYSTEM			
	ERDA RECON	LOCKHEED DIALOG	SDC ORBIT	BRS
(b) Charge for adding records to file	0	\$200/ 2,000	\$100/ 1,000	\$.05/ record \$1,000 min.
(c) Special feature system programming change (e.g. a specially designed citation format display or printout)		\$200/@		
(d) File storage charge (per million characters per month)	0	\$25/mm.	\$150+ \$25/mm.	\$12/mm.
				*
(e) Charge for entire or major alteration of file design after it has been fully loaded, & gone through a period of user testing		\$500		
(f) Total one-time costs for initial file loading				
(i) PLANBASE (3100 records)	0	\$2,000	\$2,000	\$1,000
(ii) FIREBASE (4000 records)	0	\$2,000	\$2,000	\$1,000
(iii) WESTFORNET (17,000 records)	0	\$2,000	\$2,000	\$1,000

7. System has adequate staffing and equipment to rapidly load files, add records, make changes

(a) Support staff size				
(b) Initial file loading time	1 mo.	1 mo.		1 mo.
(c) Adding records to file, lag time				
(d) Time to complete changes in records				
(e) Time to program and add specially requested features				1 mo.

* This character count is not just based on the numbers in a file's citational fields. It also includes the amount of characters which the system programming requires be added to control or facilitate searching, display & printing options (e.g. the number of characters in the "inverted file."). Consequently if all file fields are made searchable, the character count is about 2.3x that of the number of characters that the file builder has placed in the citational fields.



B. SYSTEM OPERATIONAL DEPENDABILITY

8. System has shown a record of operational reliability					
(a)	Amount of system down time per month (during regularly scheduled operating hours)	12.4% (1/78-3/78)			ca. 2%
(b)	System features work as advertized				
(c)	Number of programmers assigned to system maintenance (full time equivalents)	3.5			
(d)	Number of years system has offered regular service	2.5 (?/76)	6+ (?/71)	7+ (?/70)	1 (?/77)
9. System has shown a record of keeping its available option features up with the state-of-the-art of other on-line search systems					
		no	yes	yes	yes
(a)	Average lag time to implementation of catch up features				
(b)	Number of new system features added within past 12 months				
10. System staffing is adequate and readily available to answer questions					
(a)	Consumer services information: number of times promptly answered when phoned	2 of 2	3 of 3	0 of 3	3 of 3
(i)	Have per day customer service line staffed		11 hrs.	12 hrs.	
* (b)	Technical consultant: number of times were available when called	2 of 2	2 of 2	0 of 3	2 of 3
(c)	Number of system consultants available during maximum systems usage times		7?		4
(d)	Average number of hours per weekday consultants are scheduled to be available				32?
11. System has adequate equipment to promptly service demand loads					
(a)	Total peripheral storage capacity of all equipment available to system (millions of bytes)		private info.		
(b)	System must share computational equipment capacity with other (non file searching) users	yes	no		no

* These figures include the number of times customer service personnel were unable to get hold of a technical consultant to answer a question, as well as direct calls to technical consultants.



SEARCH SYSTEM			
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

(c) Number of outside points from which search demands originate			
(i) Number of dial-up sub- scriptions/permits	221 (3/78)	4000- 5000	
(ii) Number of dedicated phone line stations	41 (3/78)		
(d) Number of search sessions per month	5027 (4/78)	private info.	
(e) Search requests load on systems processing capacities			
(i) Number of searches per peak use hour		private info.	
(ii) Number of hours of connect time per peak use hour		private info.	
(iii) Number of off line citations printed per month	239, 155 4/78		



C. AVAILABLE FILE SEARCHING FEATURES

12. System searching logic options

(a) Boolean logic operands which can be used in searching				
(i)	"And," "or," and "not" operands	yes	yes	yes yes
(ii)	"XOR" (system has a Boolean logic option which permits searching for appearances of 2 keywords only when they do not occur adjacent to each other)	no	no	no yes
(b)	Boolean logic can be used to search author and keyword fields	yes	yes	yes yes
(c) Boolean logic can be used to search title fields				
(i)	During the initial search of the entire file	no	yes	yes yes
(ii)	Only after creating a subset from the entire file of records	yes	yes	yes yes
(d)	Number of RRTIS citational fields on which Boolean logic can be used during the initial searching of the entire file	2 *		all
(e)	Number of other RRTIS citational fields on which Boolean logic can be used to search subsets of the file	2 **		all
(f) "Truncation" techniques can be used on search words to capture all possible occurrences of prefix and suffix forms (without having to specifically enter such word form variations into a search profile)				
(i)	System permits truncation of righthand end of search words Number of citational information fields on which this option can be used	no	yes	yes yes
(ii)	System permits truncation of lefthand end of search words Number of citation information fields on which this option can be used	no	? yes	yes no

* The fields are: REON - author & keywords

** The fields are: RECON - title & abstract (but only for 20 of the items in the subset at a time).



SEARCH SYSTEM			
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

(iii)	System permits specification of limited total search character length for possible prefix or suffix variations of truncated words. Number of citational information fields on which this option can be used	no			
(iv)	Number of terms which can be accumulated with the same truncation stem		400	800	
(g)	System permits use of "variable character key" techniques within search terms to cover the variable occurrence of hyphens, blank spaces or complete closures within compound words. Number of citational information fields on which this option can be used	no	yes	yes	
(h)	System permits limiting search to only documents with certain characteristics				
(i)	Search can be limited to documents written in a specified language				
(ii)	Search can be limited to only certain types of documents (e.g. only books, only journal articles, only maps, only computer media)	no			
(iii)	Search can include documents in which the subject matter described by search terms is either the major or minor emphasis or limited to only include documents in which they are the major emphasis	no	no	yes	no
(iv)	User may limit scope of search to particular years or volumes	yes			
(v)	Searches can be restricted to the most recently entered segment of a file		yes	yes	yes
(vi)	User may limit scope of search to literature on particular geographic areas				



SEARCH SYSTEM			
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

(i) System has "word adjacency" searching features which permit limiting document identification to only those situations in which paired search words occur immediately adjacent to each other (e.g. "natural" adjacent to "resource"). Number of citational information fields on which this option can be used	yes? *	yes		
(i) System permits use of "word adjacency" features (e.g. "operation" adjacent to "research"). Number of citational information fields on which this option can be used	no	yes	yes	yes
(ii) Systems permits use of word adjacency" and "character string" searching options in combination with each other. Number of RRTIS citational information fields on which this option can be used	no			
(j) System features permit searching for user specified strings of letter combinations and blank spaces (with any number of spaces proceeding or following the character string and/or occurring at specified gap positions in the string, e.g.: non # market # good # valuation:). Number of citational information fields on which this option can be used	yes?		yes	
(i) Number of fields in subsets which can be searched for character strings	0		all	
(k) User can vary the specific citational information fields on which searching is to be done (e.g. occurrences of a search word in the digest field can be excluded while all occurrences in title fields result in citation retrievals)				
(l) Search term profiles can be saved for later use in different files, file updates, etc.	no	yes	no	
(m) The full text in titles and abstracts can be searched for words or phrases	no	yes	no	

* This search feature can only be used to search subsets created from the file (see REON NEWSLETTER No . 24, p. 1)



SEARCH		SYSTEM	
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

- (n) System features permit use of "nested" logic" in searching. The individual operations specified by groups of search terms and commands can be completed to form an initial subset of selected documents. Subsequently the next sequence of search instructions operate on the initial subset to arrive at a final set of identified documents satisfying all of the "nested" commands.

(i) Two levels of "nested logic," text words, search instructions can be used	no	no	yes	yes
(ii) Three levels of "nested logic" search instructions can be used	no	no	no	yes

13. System on-line information field display options

(a) Display format(s) are predetermined by system	yes
(b) User can control display options	no

14. System off-line printout options

(a) An off-line sorting option is available to arrange printed out records alphabetically by author name and/or date etc. # of RRTIS fields which can be used for sorting	yes 10 fields	yes 10 fields
(b) The arrangement of records in the off-line printout can only be their order on the tape		
(c) Record citation fields can be suppressed during printing so that only specifically desired fields will be printed out		
(d) Number of standard off-line citation format printout options available		10?
(e) File builder can design own citation format		yes
(f) Computer printout of searches can be delivered as non-printed media (e.g. computer tapes)	yes	yes

15. Searchable citational information fields

(a) Author(s) and keyword fields are searchable	yes	yes	yes	yes
(b) Title fields are fully searchable	no*	yes	yes	yes

* Not routinely, but special arrangements can be made to load titles (and some other fields) into a searchable field. Also titles in subsets can be searched.



	SEARCH SYSTEM			
	ERDA RECON	LOCKHEED DIALOG	SDC ORBIT	BRS
(c) Series name field can be searched	no	yes		yes
(d) Conference name field can be searched	no	yes *		yes *
(e) Texts of digests can be searched for profile terms	no	yes		yes
(f) Number of other fields in RRTIS system which can be searched	0 **	all *		all *
(g) Total number of RRTIS fields which are fully searchable	5 ****	all *		all *
(h) Total number of RRTIS fields which can only be displayed	65			
(i) Total number of RRTIS fields which are only searchable in a subset of records	all but 2	all *		all *

16. System uses "computationally efficient" searching algorithms (see appendix 16 for enumerations)

(a) Number of phone calls needed to get onto system	7	1	1	1
(b) Time needed by the computer to complete a search of files				
(i) Average in file time per file	.187 hrs.	.076 hrs.	.063 hrs.	.061 hrs.
(ii) Range of times***	NA	.043- .115hrs	.04-.08 hrs.	.066- .166hr
(c) Number of citations retrieved per search topic				
(i) Ecologic modeling (AGRI-COLA-BIOSIS)	NA	205- 686	199- 552	145- 485
(ii) Nonpoint source water pollution (COMPENDEX -AGRICOLA)	1-NA	29-92	34-95	NA

17. System file searching costs

(a) On-line searching connect time charge (per hour)	no charge	\$35/ hr.	\$35/ hr.	\$16/ hr.
--	--------------	--------------	--------------	--------------

* Fields which are searchable is entirely up to file builder, though the amount of character storage which a file occupies (and must pay rent on) is a direct function of the number of searchable fields.

** There are 70 permanent field labels in the RRTIS citational system.

*** RECON, DIALOG & ORBIT have only 1 file in common. RECON has no file in common with BRS. Two of the three in common files in DIALOG & BRS were searched.

**** The fields are AUA, AUM, AUC, CA & KEYSUG.



SEARCH SYSTEM			
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

(b) Telecommunications connections and/or time charges				
(i)	Direct FTS line(s) available (\$26/mo.)*	yes	yes	yes no
(ii)	Dedicated line(s) can be arranged	\$150/ **mo.	\$300/ **mo.	
(iii)	TYMNET line(s) charge per hour	service is not avail.	\$8	\$8 service is not avail.
(iv)	TELENET line(s) charge per hour	service is not avail.	\$5	\$5 \$3 ***
(v)	Direct commercial dialing (user pays phone company directly, daytime rates, Berkeley to system facility)	\$.52/ min. (Oak Ridge TN)	\$.19/ min. (Palo Alto, CA)	\$.59/ min. (Santa Monica CA) (\$.54/ min. (Schenectady NY)
(c)	Off-line printing charge (per record for private files)	free	\$.10@	\$.10@ ca.\$.03@
(d)	Printed copy mailing charge for private files)	free	\$1.00	\$.50
(e)	Billing procedures			
(i)	Person for whom search is done can be billed directly by system	free	if they have a contract	
(ii)	Bills are sent to regional file access and searching centers	free		
(iii)	Bills are sent to "owner" of file	free		
(f)	Cost of an average search on system			

18. Easily followed guides for searching are available and/or training sessions are offered.

(a) Approximate length of time it takes to learn search procedures for system and/or system files

* This can be an important capability because some FTS operators will not let users tie up operator lines for data transmission.

** Recon transmission rate is 240 characters per second. DIALOG transmission rate is ?

*** The \$3 rate is for calls from high population density areas such as Washington, D.C., Los Angeles or the San Francisco Bay Area. Rates for low density areas are \$6 per hr. BRS will soon average out these price differences by charging \$5/hr. for calls from any location, as its competitors do.



		SEARCH SYSTEM			
		ERDA	LOCKHEED	SDC	
		RECON	DIALOG	ORBIT	BRS
(i)	Introductory systems training:	1/2			
	session length	day*	1day	2days	1 day
**	Number of sessions per year	5*	46	84	56
***	Number of states in which sessions held	4*	11	15	6
(ii)	Advanced systems training or special training sessions for searching complementary files are regularly given				1-2
	Session length	1day*	1day	1 day	days
**	Number of sessions per year	5*	46	48	9
***	Number of states in which sessions held	4*	8	11	3
(iii)	On line tutorial feature available	yes			no
(b)	Full, clearly understandable documentation on system's operations and features is available	yes	yes	yes	yes
(i)	Cost of obtaining full documentation (system reference manuals & data base search guides) for all available complementary files	free	\$60	\$75	\$15
		****	***	***	
			**		

* RECON offers introductory training and advanced system training in the same 2 day periods, with 1/2 of the 1st day devoted to new users & all of the 2nd day devoted to more advanced system use.

** Data base periods from which these figures were extrapolated are: DIALOG - 21 Nov. 1977 - 20 Apr. 1978; BRS - introductory Apr. - Jun. 1978, data base specific 8 Sep. - 16 Dec. 1977; ORBIT - 3 Apr. - 21 Jun. 1978; RECON - 24 Jan. - 27 Sep. 1978.

*** The states in which sessions were held during the data base periods given in footnote ** are: RECON - MA, TN, IL, CO; DIALOG - PA, FL, CA, CO, MI, NY, IL, DC, MN, TX, MO, MI; ORBIT - AL, CA, CO, FL, IL, LA, MA, MI, MO, NJ, OH, PA, TX, YA, WA; BRS - MN, PA, MA, LA, CT, IL, DC, NY, MO.

**** Free to those who have been issued user identification code words or other authorized system users.

***** \$10 for the basic system use manual & \$250 for each of 2 data base file detailed search guides. A third will be issued in late summer 1978 (cost \$25). Detailed search guides on individual files can not be purchased separately.

***** \$15 for the basic system use manual & an average of \$5 per file for the detailed search guides (which may be purchased separately). There are 12 existing files in ORBIT which would be complementary to RRTIS users.



D. SYSTEM ACCESSIBILITY & COMMUNICATION

*19. Telecommunications connection - options available

(a) Direct FTS line dialing	yes	yes	yes	no
(b) Via FTS operator	yes	yes	yes	yes
** (c) TELENET communications network	no	yes	yes	yes
*** (d) TYMNET communications network	no	yes	yes	no

20. System has adequate telecommunication ports to service all users during peak use times

(a) Percent of time system access can not be gained due to busy phone lines	ca. 86%	ca. 3%	ca. 3%	ca. 3%
(b) Lines				

21. System access should be equally available to all government and nongovernment users. Availability of telecommunication ports to various user groups

(a) Number of telephone access ports available to Forest Service searchers	3			91
(b) Number of ports available to BLM, SCS, NPS, FWS and other federal land management planning agencies	0			same 91 ports
(c) Number of ports available to University and State government users	0			same 91 ports
(d) Number of ports available to general public and private business users	0			same 91 ports
(e) There are higher priority classes of users of system or of computer facilities which service system	yes	no	no	no

22. Availability of right to search files on system

(a) Purchasable by contractual arrangements	no	yes	yes	yes
(b) By cooperative agreement/arrangement	yes	no	no	no
(c) By special administrative clearance/arrangement	yes	no	no	no
(d) Data base access can be controlled by file "owner"	yes	yes		yes

* For service costs see 17 (b)

** TELENET's 67 phone numbers cover 57 cities in 29 states and the District of Columbia (as of 10/31/77).

*** TYMNET's 167 phone numbers cover 122 cities in 39 states and the District of Columbia (as of 10/31/77).



SEARCH SYSTEM			
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

23. System scheduled to be in operation

(a) Number of hours per week day system is scheduled to be operational

(i) Average daytime hours (8 AM-5 PM Pacific Time)	5 hrs.	9 hrs.	9 hrs.	6 hrs.
(ii) Average night time hours (all other times)	6 hrs.	10.7hrs.	9+hrs.	6 hrs
(iii) Total hours per week	55 hrs.	98.5hrs.	90.25 hrs.	60 hrs

(b) Number of hours per weekend system is scheduled to be operational

(i) Average daytime hours	0	2 hrs.	2.75hrs	0
(ii) Average night time hours	0	1 hr.	2 hrs	0
(iii) Total weekend hours	0	6 hrs.	9.50 hrs.	0

24. System should be accessible by a wide range of remote terminal brands and models

(a) Number of remote terminal styles that are compatible with system

(i) type remote terminals are compatible with system				
(ii) TELENET COMPATIBLE TERMINALS	NA	37		37
(iii) TYMNET COMPATIBLE TERMINALS	NA			NA

25. System procedures provide rapid transmission of printed search results to users

(a) When actual searching is done by someone other than person requesting search, system procedures enable direct mailing to requestor

no no yes no

(b) Printouts must be mailed to regional searching centers or file "owners" for subsequent remailing to search requestors (this extra step adds about 3 days to search delivery time)

yes yes no yes

(c) System procedures enable direct billing of individual requesting search when actual on line search has been performed by a regional search center or others

NA



SEARCH		SYSTEM	
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

E. SYSTEM PRINTING FOR PUBLICATION CAPABILITIES

26. System is able to produce printouts to facilitate publication				
(a) System can make special arrangements to produce printed copy in publication formats	yes	no	no	no
(ii) In a user specified format				
(b) System has available options for producing printed copies for editing and review purposes (i.e. double spaced)	no	no	no	no
(c) System has available options for assembling tape with printing commands for GPO publication	yes	no	no	no
(d) System can make special arrangements to produce tapes, diskets, etc. to facilitate publication	yes	no		yes
27. System is able to generate indices to accompany publication of bibliographies				
	yes	no	no	no
28. System turn around time for publication copy requests				
(a) Average number of days turn around time	6 mo.	NA	NA	NA

F. MISCELLANEOUS SYSTEM FEATURES

29. System has an effective database availability "advertisement" system				
(a)	On line system news can be used to announce availability of new private files			
(b)	System newsletter can be used to announce availability of new private files			
30. System is receptive to adding other RRTIS citational data bases and the WESTFORNET data base to its on line files				
(a)	RRTIS data bases would not be merged into a single file which would make it difficult to separately search each data base	yes	yes	yes yes
31. System has other complimentary citational data base files which would also be useful for wildland planners				
(a)	Total number of files on system	22	62	42 10
(b)	Number of complementary files available on system (see appendix 31 b-c-d for listing & enumerations)	4	17	12 6
(c)	Total number (millions) of on-line records in complementary files (see appendix 31 b-c-d for calculations)	0.984 mm.	11.808 mm.	8.649 mm. 3.101 mm.
(d)	Total number of off-line records in complementary files	0	0	0 3.88mm
* (e)	Average total searching charge per complementary file (see appendix 31 e-f for calculations)	no charge	\$91.47/ hr.	\$115/ hr. \$25.77/ hr.
(f)	Average off line printing charge per citation from complementary file (see appendix 31 e-f for calculations)	no charge	\$.127/ cit.	\$.159/ cit. \$.033/ cit.
32. Copies (tearsheets, microform, xeroxes, etc.) of documents identified by a search are available from system				
		no	no	no no
33. System offers SDI services				
(a)	Number of files available in SDI service	NA	yes 11	no NA yes 10
(b)	Number of records added to complementary SDI service files per month	NA	82,000 6 files	NA 39,000 5 files

* Costs given include file charge & system connect time charge & exclude communication line costs.



SEARCH		SYSTEM	
ERDA	LOCKHEED	SDC	
RECON	DIALOG	ORBIT	BRS

(c) Average monthly cost of SDI search per file searched	NA	\$7.50	NA	\$3.00
(d) Maximum number of terms allowed in standard SDI profile	NA	15	NA	no limit
(e) Charge for each additional term added to search profile	NA	\$.50@	NA	no charge
(f) Maximum number of printed records included in standard charge	NA	25	NA	no limit
(g) System could routinely conduct SDI profile searches of RRTIS, WESTFORNET and other complementary files	no	yes	no	yes



APPENDIX XV

Basis for Estimated Costs of Alternative Services

BALLOTS Prices

1st year only

Terminals

Zentec for Berkeley Center	\$3800.00
Installation (Other centers have the low speed terminals they will need)	80.00
Start up charge - Berkeley	900.00
Start up charge - other libraries	225.00
	<hr/>
	\$5005.00

Annual Charges

Leased line	\$1730.00
Modem rental	230.00
Citation entry (based on estimate 5000 citations/year maximum)	6620.00
Outputs - monthly tapes @ 37./tape	444.00
	<hr/>
	\$9024.00

Search charges for other WESTFORNET libraries	4000.00
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TOTAL	<hr/> \$13,024.00
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Auto Graphics: Summary of Charges

Initial charge for programming	\$1200.00
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Monthly Charges

Master file update	100.00
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.10/record with estimated 300 citations/month	30.00
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	\$130.00
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Monthly Alert

each month	250.00
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\$15/page with estimated 8 pages/issue (120 x 4)	480.00
--	--------

	\$730.00
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Semi-annual Charges

each time	250.00
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estimate of cost based on present size of catalog and on dictionary catalog with blowup factor of 8, and 8 citations per frame.	3150.00
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	\$3400.00
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Annual Costs

File update	(12 x 130)	1560.00
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Monthly Alert	(12 x 730)	8760.00
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COM Catalogs	(2 x 3400)	6800.00
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TOTAL		\$17,120.00
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In House Production of COM Catalogs
(From BALLOTS tapes or FAMULUS 150)

Monthly Costs (computer runs)

Convert accessions tape to FAMULUS format	\$ 12.00
Delete items not intended for the catalog	8.00
Blow up accessions to dictionary catalog format	11.00
Sort	12.00
Cumulate (merge with past Monthly Alerts)	14.00
Miscellaneous	18.00

Monthly Costs (labor for computer runs)

6 hours @ \$7.00/hour	42.00
	<hr/>
	\$117.00

Semi-annual Costs (computer runs)

Merge six month cumulated file with master	150.00
Create output files	250.00
Re-work output file for COM masters	250.00
Miscellaneous	200.00

Semi-annual Costs (labor for computer runs)

28 hours @ \$7.00/hour	196.00
	<hr/>
	\$206.00

Annual Costs

12 x \$117.00 plus 2 x \$206.00	\$3496.00
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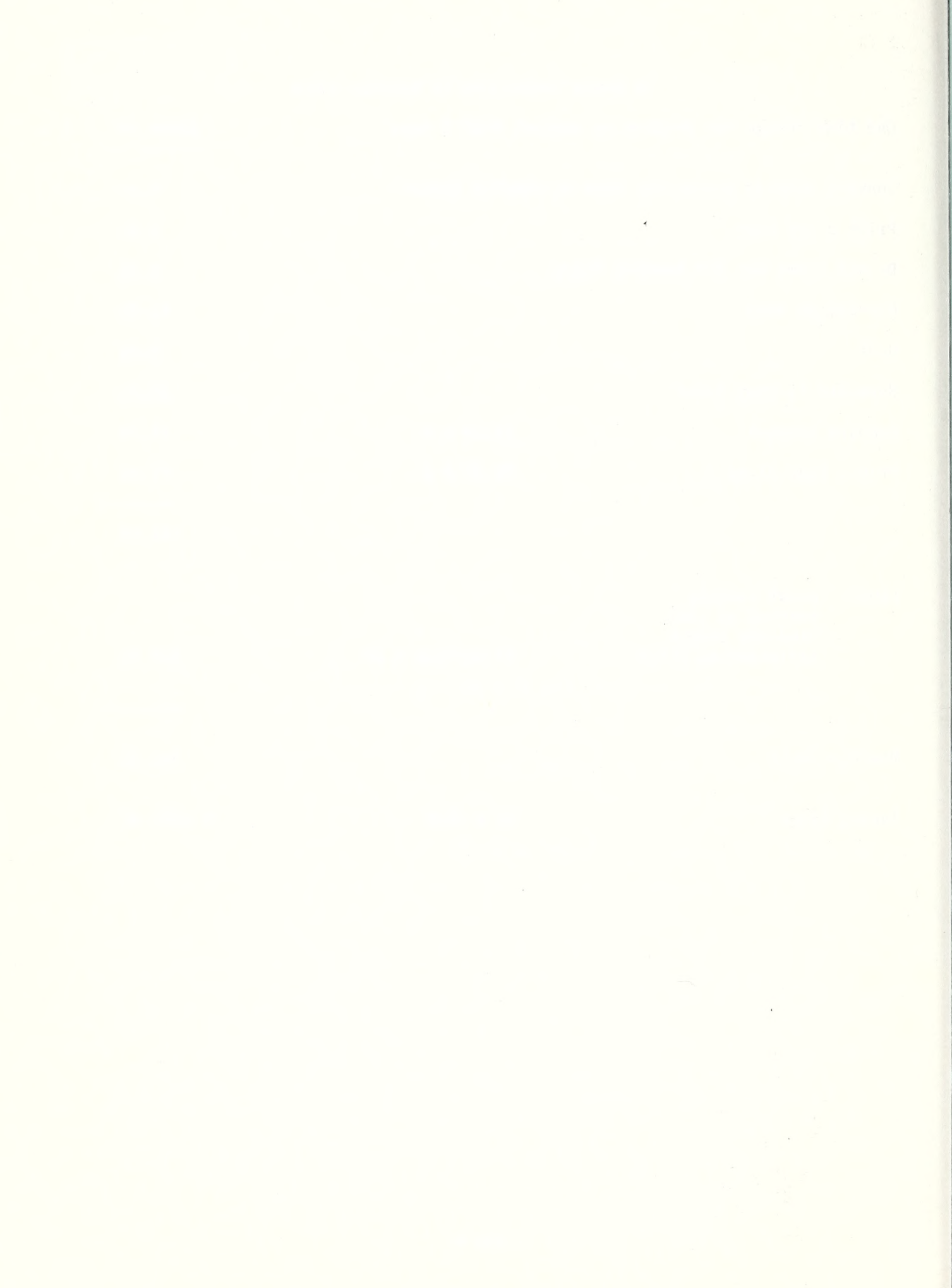
In House Production of Monthly Alert

One time charge for program to convert MARC 2 tape		\$1000.00

Convert monthly accessions tape to FAMULUS format		9.00
Print proof copy		8.00
Delete items not for Monthly Alert		8.00
Correction runs		52.00
Sort		8.00
Separate to four files		30.00
Prepare indexes	\$6.00 x 4	24.00
Print four files	\$5.00 x 5	25.00

		164.00
Labor: proof reading		
setting up jobs		
handling output		
manipulating files	\$7.00/hour x 24	168.00

Monthly Total		332.00
Annual Total	12 x \$332	\$ 3984.00





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FAMULUS Costs for Calender 1977

Computer Charges

Program charges \$ 1660.00

Monthly Alert plus updating 5450.00

7110.00

Labor

Programmer 1920.00

Technician 3000.00

4920.00

Total

\$12,030.00

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